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CONTENTS

	PAGE
Editorials	247
Publications Received	252
Letters to the Editor	253
The Scrap Heap	254
Overseas Railway Affairs	255
The new Brussels-Ghent Line, Belgian National Railways	257
Colour Light Signal Aspects	258
U.S.A. Rail Specification and Classification	258
Sir Vincent Raven	260
The History of the Mechanical Locking Frame	261
Railways and Road Transport Section	263
Transport Advisory Council	264
A New Type of Two-tonner	265
The Karrier Road-Rail Vehicle	267
Automatic Train Control in Switzerland	269
Regulated Sorbitic Treatment of Rails	271
Railway News Section	273
Personal	273
Euston House, L.M.S.R.	274
News Articles	277
Notes and News	280
Contracts and Tenders	282
Official Notices	283
Share Market	284

Euston House They have erected a steel framed building and have sufficiently clothed the verticals of construction; they have set it upon a strong support of stone in the lowest part; they have provided long units of fenestration broken up by slender vertical divisions, thus allowing for easy partitioning of the floors into well-lighted apartments; they have tied in these window units with unassuming bands of stone; they have faced the walls with brickwork of pleasing colour; they have avoided long lengths of straight windows by forming them in shallow bays between the piers; they have given us strong corners of brickwork instead of cantilevered voids; they have obtained good proportion by means of a moulded—yes, moulded—cornice; they have capped the whole with a central feature which rises in receding planes to a dominating tower; they have detailed the stonework with mouldings of delicacy and refinement; in short, they have avoided crankiness and have produced a building that embodies the best and eschews the worst of modern architectural expression, satisfying essential needs in an unassuming manner. "They" are Mr. W. H. Hamlyn, A.R.I.B.A., of the L.M.S. Railway, and Mr. A. V. Heal, F.R.I.B.A. We thank them. Euston House will please long after some of its contemporaries have been discredited.

Southern Railway Dividend

For the year 1933 the dividend on the Southern Railway preferred ordinary stock was announced on Monday at 3 per cent., comparing with 1 per cent. for 1932 and 4 per cent. for the whole year 1931. This was up to the best expectations and has been fully earned, as the carry forward is increased from £207,173 to £224,927. The dividend for 1932 was earned with a surplus of £113,798. This year's dividend will require £551,732 more on the £27,586,601 of preferred ordinary stock. Allowing for the increase of £17,754 in the carry forward and for the £190,000 required for the full year on the £4,750,000 of new redeemable debenture stock which ranked for interest as from January 1, 1933, net revenue for the year 1933 would appear to be approximately £759,500 better than that for 1932. No operating figures are given in the final dividend statement, but in the interim statement sent out on July 27 last it was recorded that net revenue for the first half of 1933 was about £280,000 more than for the first half of 1932. Railway expenditure in the first half of 1933 was reduced by £250,000, and it is clear that in the second half of the year substantial economies must also have been effected, though naturally not on the same scale as in the second half of 1932, when the saving was in the neighbourhood of £700,000.

The Week's Traffics

In the past week's returns of the four group railways increase in merchandise returns are again the most prominent feature, and for the six weeks of the year to date the aggregate gain in these traffics for the four companies together amounts to £821,000 or 16.45 per cent. The L.N.E.R. aggregate advance in merchandise traffics is £311,000 or 20.01 per cent., that of the L.M.S.R. is £349,000 or 15.64 per cent., and that of the Great Western £132,000 or 14.79 per cent. For all four companies together the aggregate advance in all traffics to date is £1,030,000 or 7.05 per cent. The Liverpool Overhead and Mersey traffics to date show increases of £375 and £1,704 respectively. For 32 weeks the London Passenger Transport Board records earnings of £15,882,800. Irish railway returns are now all on the right side, the Belfast & County Down being £227 up, the Great Northern £13,550 up, and the Great Southern £17,068 up. In the case of the Great Northern it is to be noted that the returns compare with those of a period affected by the strike in Northern Ireland.

6th Week						
	Pass	&c.	Goods, &c.	Coal, &c.	Total	Year to date
G.W.R.	..	+ 1,000	+ 16,000	+ 1,000	+ 18,000	+ 134,000 + 5.43
L.M.S.R.	..	+ 6,000	+ 61,000	+ 7,000	+ 74,000	+ 422,000 + 7.13
L.N.E.R.	+ 48,000	+ 13,000	+ 61,000	+ 412,000 + 9.47
S.R.	..	+ 2,000	+ 3,500	— 2,500	+ 3,000	+ 62,000 + 3.30

Great Western Dividend

As was generally expected, the directors of the Great Western Railway Company in their statement issued on Wednesday afternoon recommend a final dividend of 2½ per cent. on the consolidated ordinary stock, making 3 per cent. for the whole year 1933. This is the same as for the whole year 1932, though the interim payment last August was ½ per cent. against ½ per cent. in August, 1932. The carry forward is reduced from £42,989 to £40,679. In order to make the proposed payment use is to be made of £71,529 profit on realisation of investment and a sum of £1,350,000 is to be appropriated from contingency fund. During the year, however, certain reserves—mainly in respect of income tax—have been

released as they are no longer required and this has enabled the contingency fund to be augmented by £850,000. The net reduction in the fund is therefore not more than £500,000. Incidentally, the maintenance of the 3 per cent. dividend preserves the full trustee status of the company's prior stocks, but its dividend policy of the past two years has not been governed primarily by this consideration. At the annual meeting last February the late Lord Churchill explained that the Company possessed free reserves which were built up for use in abnormal times to be available amongst other purposes for supplementary dividends on the ordinary stock, and to a large extent they represented undistributed profits of previous years or moneys set aside to provide for contingencies which had not eventuated. Net revenue for the year 1933 amounted to £4,828,561, an increase of £369,158 on 1932. Gross receipts from the railways and ancillary businesses were £38,687 less than in 1932, but in gross expenditure there was a saving of £459,548, or 1.88 per cent.

Overseas Railway Traffics

Amongst Argentine railways during the past fortnight there has been consistent improvement in the traffics of the Central Argentine, which has, during that period, reduced its decrease for the year to date by £70,000 down to £674,000. The Pacific has also shown increases totalling £17,000 during the two weeks, bringing its aggregate decrease down to £147,000. On the Great Southern, however, there has been some variation, as its gain of £12,000 for the past week goes against a loss of £17,000 for the previous week, and the Western has to set off a decrease of £4,000 in the 31st week against an increase of £5,000 for the 32nd week. The Entre Rios for the 31st week had an advance of £4,200, which reduced its aggregate decrease for the year to date to £1,700. Continuous improvement is being shown in Canadian Pacific earnings, the two latest returns together recording an increase of £175,000.

Railway.	No. of Week.	Weekly Traffics.	Increase or Decrease.	Aggregate Traffic.	Increase or Decrease.
Buenos Ayres & Pacific ..	32nd	139,000	+ 11,000	3,176,000	- 147,000
Buenos Ayres Great Southern ..	32nd	302,000	+ 12,000	6,181,000	+ 66,000
Buenos Ayres Western ..	32nd	75,000	+ 5,000	2,012,000	- 93,000
Central Argentine ..	32nd	210,000	+ 28,000	5,274,000	- 674,000
Canadian Pacific ..	5th	431,000	+ 75,600	2,225,000	+ 334,400
Bombay, Baroda & Central India	44th	178,275	+ 11,775	6,495,900	+ 170,850

State or Private Railways

Mr. C. E. R. Sherrington's paper last week to the Great Western Railway Lecture and Debating Society at Paddington, briefly summarised on page 277, lead to a discussion of the essential difference in the motives behind state-owned and privately-owned railway systems. Excepting this country and North and South America, nearly all countries possess state railway systems which have been built up primarily to serve trade and to assure the means of transport best suited for military purposes in case of war. Privately-owned railways must necessarily aim chiefly at earning a profit for their proprietors: they must gather in more money than they disburse if they are to be financially sound according to orthodox principles. State-owned systems are not under this obligation, for deficits can be and are made up from the national exchequer. In prosperous times this essential difference is not necessarily important, but during a world-wide industrial depression it may exercise a vital effect, as certain industries in this country are learning to their cost. Competition for foreign markets was never keener than it is now, and we are being hard put to it to hold our own against countries whose state railways are

able to charge much lower rates for the haulage of their products than we are. State subsidies are another means by which transport competition can be stimulated.

Rus et Urbs Now that Mr. Charles W. Clark, F.R.I.B.A., has retired from his position of Architect to the Metropolitan Railway, on its absorption by the London Passenger Transport Board, the recently-opened station at Northwood Hills may be looked upon as his official swan song. On page 272 of this issue we illustrate this station and also Cockfosters station, which was designed by Mr. C. H. Holden, F.R.I.B.A., and is the latest on the Piccadilly tube extension. Perhaps the contrast between the architectural styles of these two stations springs from the influence of environment, for Mr. Holden was designing for a line that passes through the heart of London, and Cockfosters carries on the tradition of its mid-city sister stations; it is business-like, to the point, without useless embroidery, terse, almost staccato, the exemplification of Efficiency with a capital E. But Mr. Clark's old Metropolitan line runs through suburban into rural surroundings, and Northwood Hills station suggests the homely access to a railway which—passing through meadows, by trees and wayside flowers—gives glimpses of old-world villages. Alas, the tide of villadom is flowing fast towards Northwood; too soon Mr. Clark's simply-pleasant building, and our memories, will alone remain to remind us of what was once so truly rural.

Liverpool Street Station

It is a curious thought that, six months after the opening of Liverpool Street station, grave doubts were expressed as to whether there would ever be enough passengers to justify the expense! The modest station which is celebrating its diamond jubilee this month—it was brought into use on February 2, 1874—has grown into one of England's greatest termini, covers 15 acres, and handles the most intensive steam-operated service in the world. The first step in the construction of the Great Eastern section of the present L.N.E.R. was the opening of the Eastern Counties line from Mile End to Romford on June 20, 1839. The London terminus at Shoreditch on the site of the present Bishopsgate goods depot was opened on July 1, 1840, when a special peal was rung on the bells of St. Leonard's, Shoreditch. We reproduce in our Scrap Heap page a time-table of the railway dated 1845, by which time the line extended to Colchester. The service called for ten weekday arrivals in London (including one mixed train) and a corresponding number of departures. At the present time about 1,230 trains arrive and depart from Liverpool Street every day, conveying 230,000 passengers. Between 8.0 and 10 a.m. no fewer than 200 trains arrive and depart, but the record is achieved between 5.0 and 6.0 p.m. when there are 108 trains in and out within the hour, necessitating 2,000 signal movements; at 5.0 p.m. each of the 18 platforms is occupied by a train ready to depart. The working of over 100 steam trains in two directions over six lines in an hour calls for a high degree of efficiency in organisation, and Liverpool Street is claimed to be the busiest station in the world, with the sole exception of Flinders Street, Melbourne.

On the Site of Bedlam In 1247 the land upon which Liverpool Street station stands belonged to Simon FitzMary, Sheriff of London, and consisted of "orchards and gardens, of ditches and marshes" watered by a sluggish stream. When monks from

Bethlehem came to London at that time seeking alms for the support of their church and monastery in the Holy Land, FitzMary gave them the land and built upon it a priory where for all time masses should be sung for his own soul and the souls of his friends. Bethlehem Hospital, as it was called, at first harboured the poor, the sick, and the aged, but by 1377 it has become the mental hospital which half the world knows as "Bedlam." In 1676 the hospital was moved to new buildings in Moorfields. Old Bethlehem, a thoroughfare running along the former grounds of the Bethlehem Hospital, having been rebuilt and widened, took its name of Liverpool Street from Lord Liverpool in 1829. The buildings demolished to make way for the first (1874) portion of Liverpool Street station included the City of London Theatre, and the City of London gas works and gasometer, the latter being near Worship Street. The second portion of the station, the east side, was opened on April 2, 1894, and in the work of clearing the site some of the most extraordinary alleyways and premises in London were swept away. The construction of Hamilton House, the large office building alongside the east side of the station involved the demolition of Sir Paul Pindar's house, used as an inn. This residence of the great Royalist ambassador and merchant of King Charles the First's reign was a delightful example of Elizabethan woodwork. The front of the house was transferred to the South Kensington Museum.

Mr. Ralph S. Griffiths The election of Mr. Ralph S. Griffiths to the Presidency of the Institution of Railway Signal Engineers is a very happy appointment. We are thinking particularly of the intimate knowledge of signalling that he must have acquired during his forty years' connection with the design, development, manufacture, and installation of signal plant. It is true, further, that a contractor has a wider circle of acquaintances, especially with overseas members, than has a railway officer. What appeals to the older school of signal engineers is that Mr. Griffiths, like his father, W. J. Griffiths, before him, was associated with that fine firm, McKenzie & Holland, of Worcester. We have, on more than one occasion, referred to the indebtedness of railways—at home and abroad—to signal contractors for the introduction and development of new ideas in signalling. That was particularly the case with the firm just named, which was, for instance, the agent for the Westinghouse Brake Company's electro-pneumatic signalling and was connected with the installations at Bolton, Glasgow Central, and Newcastle. In this relation it may be remembered that one of the companies associated with the Westinghouse Brake & Saxby Signal Company, on its formation, was the McKenzie, Holland & Westinghouse Power Signal Company. His training in such a school accounts, to no small degree, for the thoroughness that Mr. Griffiths displays in all he has to do, and the Institution, therefore, is sure to do well during his year of office.

Encouraging the Signal Institution The influence of the world-wide economic situation on the number of members and on the finances of the Institution of Railway Signal Engineers, as revealed in the annual report, prompts us to give a word of encouragement to that body. We would remind the members of the remarkable progress made in signalling during the last ten or twelve years. Within that time colour light signals, with the subsequent addition of the double yellow, have been introduced; also the long-distance operation of facing points, together with the use therein of power provided by hand motor generator. There have been the many

varied applications of track circuit in track locking, approach locking, approach lighting, and so on, and the elimination of signal-boxes by the substitution of advance sections. There are now examples of route-lever signalling, and an installation of speed signalling and another of centralised traffic control; also rail-brakes which are essentially a phase of signalling. One of the most remarkable developments has been the abandonment, after ninety years' implicit confidence in it, of mechanical interlocking in favour of all-electric interlocking. That has now been followed by what is known as relay interlocking, on which, at Thirsk, has been superimposed route-lever operation. With such a record for so short a period, the institution may reasonably look forward to yet greater usefulness.

An Improved Sorbitic Rail Treatment In an editorial article appearing in our January 26 issue, we referred to the progress which is being made at the present time towards improving the wearing capacity of the railway rail. Both the use of alloys and of heat treatments, as we pointed out, are playing their part in providing better resistance than before to abrasion. As regards heat treatments, reference was made to the latest development of the Sandberg sorbitic treatment, which has now been brought to more precise limits of regulation and control than ever previously, with correspondingly beneficial effects on the structure of the rail-head. Elsewhere in this issue we describe and illustrate some rails which have been subjected to the latest form of regulated sorbitic treatment, in which the first stage of the quenching is accelerated by the use of a greater head of water. They were then laid in a track over which an intensive electric passenger train service is conducted; from the photograph reproduced the improvement in wearing capacity is obvious. The sorbitised rails were, like the comparison ordinary rails, of medium manganese analysis, and after the sorbitising were passed through the Sandberg oven, in order that retarded cooling might relieve any internal strains resulting from the quenching, and ensure an entire absence of internal fissures. That such retarded cooling in no sense acts as an annealing agent is clear from the excellent way in which these rails are wearing.

Accidental Alloys Accident as the cause of scientific discovery and invention is to-day becoming an increasingly rare phenomenon. But it is to accident that we must attribute the most recent discovery of importance in the non-ferrous alloys. That is if we are to believe Dr. H. W. Brownsdon, the Research Manager of I.C.I. Metals Limited. He unfolded a most interesting story at Imperial Chemical House on February 14 to an audience of the technical press. He and his staff had been experimenting upon the aluminium brasses, and had discovered that upon the addition of a low percentage of nickel to the alloy the product proved impossible to roll. Following up this clue it was found that the addition of nickel and aluminium to brass and bronze resulted in each case in an alloy which on rapid quenching yielded a soft metal; but that this metal possessed the peculiar property of trebling in hardness and doubling in tensile strength by heating to temperatures in the region of 400° to 600° C. Altogether a series of such alloys has been worked out to which the generic name of Kunial (an obvious chemical pun) has been given. The series consists of Kunial brass, copper, nickel silver, and bronze. They may be extruded, rolled, drawn, and cold worked exactly in the same way as ordinary brass. The hardening effect is not a surface one but penetrates through the whole body of the metal.

London Midland & Scottish Railway

TO have converted a decrease in net revenue of £300,000 at June 30 into an increase of £807,862 at December 31 is a gratifying achievement. This the management has succeeded in accomplishing for the year 1933. The full report and accounts now published show that during the year there was a decrease of £321,822 in railway receipts, which amounted to £58,185,439, and in the railway expenditure of £48,223,760 there was a reduction of £976,579, so that the net railway receipts of £9,961,679 showed an improvement of £654,757. This saving of £976,579 follows upon reductions of £12,313,000 effected during the five years 1928-32.

Profits from ancillary businesses in 1933 amounted to £144,350, contrasting with a loss of £129,539 in 1932. There was an additional profit of £79,350 on steamboats, and the losses on collection and delivery and on docks were reduced by £149,853 and £20,205 respectively. Profits in the hotels department rose from £278,660 to £286,708, and the net revenue from J. Joint Lines amounted to £53,974, against £22,677 in 1932. Among the miscellaneous receipts general interest is down £113,735, but Treasury grants are £11,380 up, and dividends in motor omnibus undertakings have increased from £185,249 to £205,749, chiefly because of the improved position of the Eastern National Company. From holdings in the road motor goods carrying undertakings of Joseph Nall & Co. Ltd., and Wordie & Co. Ltd. the income was £3,023, but there was a drop from £8,125 to £6,875 in the profits from David MacBrayne (1928) Limited. The loss on the Northern Counties Railway (Ireland) has increased from £35,34 to £82,451, but in view of the handicap of the long strike early in the year this implies a satisfactory recovery in the later months of 1933. The following table shows the general financial position compared with the two preceding years:—

	1933 £	1932 £	1931 £
Total expenditure on capital account ..	452,974,229	453,037,579	453,441,064
Gross receipts from businesses carried on by the company ..	65,291,119	65,496,079	70,754,231
Revenue expenditure on ditto ..	55,185,091	56,318,696	58,998,952
Net receipts of ditto ..	10,106,028	9,177,383	11,755,279
"J" Joint Lines—company's proportion of net revenue ..	53,974	22,677	80,733
Miscellaneous receipts (net) ..	2,266,839	2,404,799	2,496,069
Miscellaneous charges ..	1,714,156	1,700,036	1,676,425
Net revenue ..	10,712,685	9,904,823	12,655,656
Interest on debenture stocks ..	4,439,171	4,439,171	4,439,171
Dividends on guaranteed and preference stocks ..	6,213,860	5,558,696	8,474,383
Balance after payment of preference dividends ..	59,654	Dr. 93,044	Dr. 257,898
Dividend on ordinary stock	—	—	238,006
Rate per cent. ..	Nil	Nil	1
Surplus or deficit, + or —	+ 59,654	—93,044	—495,904
Appropriation from contingency fund ..	—	93,044	—
Appropriation from reserve	—	—	495,904
Balance carried forward ..	59,654	—	—

Receipts from railway passengers in 1933 totalled £17,808,023, or £7,978 less than in 1932, although the receipts from ordinary third-class passengers rose from £13,171,361 to £13,265,768 and workmen's tickets from £1,046,601 to £1,058,874. Including season ticket holders, the number of passengers conveyed in 1933 was 419,413,647, an increase of 11,912,718. Allusion is made in the directors' report to the satisfactory results of "summer tickets." Parcels and mails brought in £6,472,846, an improvement of £88,867. Goods train traffic receipts other than coal class amounted to

£21,740,798, an improvement of £166,713, but in the coal class receipts of £11,599,364 there was a drop of £559,793. Total tonnage of goods traffic in 1933 was 115,832,653 tons, a decrease of 1,021,510.

In railway working expenses reductions of £50,572 were shown under maintenance of way and works, of £360,917 under maintenance of rolling stock, of £310,978 under locomotive running expenses, and of £236,512 under traffic expenses. The operating ratio of 82.88 per cent. compares with 84.09 per cent. in 1932. In engine mileage there was a saving of 947,765 miles, or 0.45 per cent., while the reduction in total engine hours was 78,370, or 0.34 per cent. An interesting table in the analysis published by the directors shows the approximate allocation of the company's receipts from all businesses for 1933:—

	Amount £	Amount per s. d.
Salaries and wages	36,100,000	11 0½
Coal	4,400,000	1 4½
Other material	8,600,000	2 7½
Rates and sundry items, less miscellaneous receipts	5,500,000	1 8½
	54,600,000	16 8½
Amount carried forward	50,000	0 0½
Total	54,650,000	16 9
Interest and dividends on capital	10,650,000	3 3
	65,300,000	20 0

Comparing with 1932 the allocation per £1 of receipts to salaries and wages has gone down from 11s. 2½d. to 11s. 0¾d., and the allocation to interest and dividends has gone up from 3s. 0½d. to 3s. 3d.

Railway Conciliation Machinery

THE railway conciliation machinery of Central and National Wages Boards which received statutory sanction under the Railways Act of 1921, though unwieldy and open to obvious objections, worked well so long as the right spirit prevailed on both sides. Until the disastrous proceedings of December, 1932, and January, 1933, the final decisions of the National Wages Board were accepted as having a moral force far more binding than any legal compulsion. But with the refusal of one party to the proceedings to accept the Chairman's casting vote the existing conciliation machinery obviously became useless for the purpose for which it was intended. The railway companies accordingly gave last March a year's notice, as they were entitled to do, under Section 62 of the Railways Act, to determine the present system, and eventually a joint committee of representatives of the four group railway companies and of the three railway unions was formed with the object of exploring some method of superseding the existing conciliation machinery by something more workable. This committee held seven meetings, in the course of which an alternative scheme of procedure was brought forward by the railway companies' representatives for discussion. This was not accepted by the union representatives, as is shown by the committee's report which was published at the end of last week.

Though it is disappointing that the first steps towards framing a new procedure have had no direct results, it is quite certain that negotiations on the subject in question have not broken down. Avenues leading to a new procedure have been explored by both sides, and there has been a failure to reach a common basis. Both sides have reported to their principals—the railway representatives to the general managers, and the union representatives to their executives—and it is now open to the principals to work out some alternative method. The union members

of the committee have so far made no proposals of their own, but have contented themselves in the main with criticisms of the railway representatives' draft scheme. There is nothing to prevent the union executives from bringing forward a plan of their own for discussion.

The existing machinery of negotiation consists of the Central and National Wages Boards. The Central Board is composed of an equal number of representatives of both sides, and on failure of negotiations on this board, recourse may be had to the National Wages Board, which consists of six railway companies' representatives, six representatives of the three railway unions, two members nominated by the Co-operative Union, two nominated by the Chambers of Commerce and by the Federation of British Industries, and an independent Chairman. It has been found by experience that negotiations at the Central Board on very many matters have been abortive, the parties making no real attempt at agreement and reserving themselves for the final struggle before the National Board, which consists largely of the same elements. The railway companies propose a Railway Staff National Council, broadly similar to the old Central Wages Board, the authority of which shall be final for everything but matters of major importance. This they consider will be an inducement towards reaching agreement at the National Council stage. If agreement is not then possible on a major issue, an appeal will lie, subject to the consent of both parties, to a National Tribunal of three members only, absolutely independent of the issues involved, the decisions of the Tribunal to be binding, and the hearing to be private. The union representatives on the joint committee accept in principle the National Council, but do not approve of the National Wages Board being superseded by the National Tribunal, and are against the decisions being final and private hearings.

Thoughts on Automatic Train Control

THE discussion on automatic train control at the International Railway Congress at Cairo last year, the most important part of which we published with a brief editorial comment in our issue of February 2, shows that opinion among railway engineers and operating officers is still divided on the fundamental question of whether or not there should be automatic brake application in the event of signals being disobeyed. The disastrous collision at Lagny on the Eastern Railway of France has invested with a peculiar interest the remarks made by that company's representative, M. Duchatel, at the Cairo meeting. In this country also there were accidents last year, fortunately unattended by such serious results, where signals were ignored in broad daylight, without even some fog to excuse the blunder. Now comes the news that the Swiss Federal Railways have decided to instal at all distant signals the Signum automatic train control apparatus, a general description of which we publish in the present issue. The problem of securing obedience to signals is one upon which engineers have been engaged for many years, but it may be said that they have now done their part and solved it, for several reliable train control systems are in existence at the present time. Behind the problem, however, is the interesting psychological question as to why signals are disobeyed. Some cases of over-running signals are extraordinarily difficult, if not impossible, to explain. Sometimes signals which were perfectly visible have been over-run, even by double-headed trains, and those responsible for the error have appeared to be honestly under the impression that the signals were really in their favour. That a man can apparently look at a signal, or signals, see it or them at "danger" and yet become persuaded to the opposite

effect, is an indisputable fact, whatever its explanation may be, and cab signals and train stops have been invented to counter the risk involved.

Some railways favour giving the driver a visual or audible cab signal only, while others favour setting the brakes in action also, in certain circumstances; or even, as in the case of the German State Railway, doing this without giving any cab signal, or certainly not an audible one. As usual in such arguments, there is something to be said for all these points of view. Those who take up the first are anxious to leave the control of the train entirely in the driver's hands. They assume him to be competent and conscientious, and say that if he is given a signal in a form which he cannot fail to see and comprehend, he will not drive on against it; and if for any reason he were to do so, the fireman would take steps to bring the train under control. This argument is satisfactory as far as it goes, but there is one important aspect of the matter which it does not take into account. With a cab signal only, if the apparatus gets out of order it does not necessarily retard the train at all, except in the elaborate installations in America, where the automatic signals along the line have been taken away. Even then, a driver could take chances and not proceed under caution all the way as he should do. But when a brake application is coupled with the warning, any carelessness in maintenance, provided the apparatus is constructed on correct closed-circuit principles, is soon reflected in traffic delays, hence an excellent incentive is given to those concerned to do their duty correctly. It need hardly be said that first-class maintenance should be rigorously insisted on for apparatus of this kind. That a partial brake application at the distant signal is a distinct aid to greater safety we consider to have been clearly proved by the experience of the Great Western, as Colonel Mount and Mr. Gresley emphasised at the Cairo Congress. The objections voiced by the French engineers appear to us too theoretical. It is interesting to recall that the Nord in the early days of the "crocodile" cab signal—it was introduced in 1872—adapted it in 1878 to act on the Smith's simple vacuum brake with which the expresses on that line were fitted for some years until the general adoption of the Westinghouse brake. It is said that the braking action was apt to be somewhat violent and the arrangement was afterwards abandoned.

Herr W. Stäckel, the Special Reporter at Cairo, in describing the German State Railway's system, explained why an audible cab signal was not given. Great importance is attached, rightly, we think, to the ordinary visual signals being seen. To make sure of this, matters are arranged so that the driver must operate the vigilance handle within a certain number of seconds after passing the distant signal—it is of no use doing it before then—or he will be detected by a brake application and a printed record which he cannot conceal. He must therefore look out for the distant signal in order to judge the precise moment when to make this movement. He is assisted in doing this by the white warning boards which precede each distant signal. With the addition of an intermediate speed control track magnet about 300 yards from the home signal and an absolute stop magnet at that signal, the system now being rapidly extended on the Reichsbahn represents the most complete and scientific attempt to apply automatic train control to be seen anywhere in Europe. The choice by the Reichsbahn of the inductive method of transmission between track and train, eliminating all actual contact, is worthy of notice; the climatic conditions in Germany would render any electrical ramp system impracticable. The same applies to Switzerland, and the action of the Federal Railways authorities in selecting an inductive apparatus is fully justified. Our remarks apply to the general principle involved, of course,

and not necessarily to every detail of the system selected. Unlike the Reichsbahn, the Swiss Federal Railways have decided, for the present at all events, to limit the equipment to distant signals, as on the Great Western here. The reasons for doing so are understandable, but are, to our way of thinking, more negative than positive. Of course the distant signal is a key signal, so to speak, and the express services are run chiefly with its aid. In fog and thick weather, when "off" it conveys an assurance to the driver that things are at that moment right for him for some distance in advance, when "on" its message is of vital importance and to miss it may lead to the gravest consequences. Provision of train control at all distant signals would therefore be a great step forward. To be content with this, however, leaves many sources of mishap untouched. Accidents have happened through trains starting from rest against a stop signal, or through stop signals being misread, after the distant signal warning has been seen and acted on. The Automatic Train Control Committee considered that a case had been made out for the equipment of certain stop signals and, for the same reasons, we consider the action of the German State Railway authorities has been far-sighted in this matter. Their system allows of all classes of signals being fitted up as need arises and funds permit. It may be mentioned that the Flying Hamburger diesel train is equipped and the apparatus works perfectly at the highest speeds. The equipment of the Berlin-Cologne and Berlin-Dresden main lines is being rapidly pushed forward.

There is an important factor in this problem to which enough attention has not always been given, although it was emphasised by the Automatic Train Control Committee in its report, and that is, the question of inter-running, varying systems of traction and uniformity of equipment. Apparatus suitable to steam locomotive traction is not always easily fitted to multiple-unit electric trains. With the extension of electrification this is bound to come into greater prominence. In spite of the grouping of the British railways into four systems, inter-running on some sections is unavoidable. Already the adoption of different features in light signals has created the possibility of confusion, and voices have been heard calling for standardisation. Different systems of automatic train control would bring about even greater complications, connected with clearances and other engineering details, so that we are liable to be faced with the battle of the gauges again in another form unless due care is exercised. That the general adoption of some good system everywhere in this country would make for greater safety, and improve the running of the trains too, seems highly probable, although considerable improvement in the visibility of the signals in bad weather—which is much needed, as our lights at present are not a great credit to us—would also do much in this direction. One thing is certain. The difficulties are no longer technical. The engineer has done his part and is prepared to meet any requirements which the operating officer can wish for. The problem is therefore, like most problems to-day, solely one of finance.

PUBLICATIONS RECEIVED

Electrical Engineering Practice, Vol. III. By J. W. Meares, C.I.E., F.R.A.S., &c., and R. E. Neale, B.Sc., &c. London: Chapman & Hall Limited, 11, Henrietta Street, W.C.2. Pp. 920. 8½ in. x 6 in. Illustrated. Price 30s. net.—Electric traction and the performance characteristics of almost every conceivable kind of electric motor are among the subjects covered by the third and final volume of this great work of reference. The latter, together with motor control, is covered with admirable completeness, and as other sections of the same volume describe the peculiar power requirements of different kinds of driven machine, there is every reason to think that the plant engineer will find this book indispensable. Electric traction is necessarily treated with some brevity, but accurate and useful information is given on all the most recent developments, including the Kando system in Hungary, the Brighton main-line electrification, and diesel-electric traction. A departure from purely technical considerations is made on page 543 by reference to a timing of 1 hr. 50 min. for 6 miles on a Southern Railway steam operated service, as compared with 21 min. taken by omnibus. It is pointed out that anomalies of this kind might be obviated by the employment of more railcars. Allusion is made to the Flying Hamburger and to the Drumm battery vehicles in Ireland. Thus the merits of forms of traction other than those involving track electrification are given due consideration. The sections dealing with testing and with the law in relation

to electricity will be generally useful, while the index covering all three volumes is particularly valuable in view of the enormous amount of matter they contain.

Presses.—We have received two attractive brochures from Henry Pels and Company, Limited, of 32-38, Osnaburgh Street, London, N.W.1, the first describing the firm's special bending and straightening press, type JH, and the second setting forth its range of folding presses. By means of special blocks or attachments, the former machine is adaptable for bending or straightening rails, zeds, tees, angles, bulb angles, joists and channels, as well as rounds, flats and squares. Its ability to deal with switch, wing and other rails for junction lay-outs will appeal to permanent-way engineers. Power is transmitted by gearing and a patented double-lever system from a fly-wheel, which is fitted with a shearing pin to protect the driving parts against overload.

The folding presses are capable of producing a wide range of complicated shapes from sheet metal, as well as wrought-iron pipes, cylinders, troughing and others of more simple form. They can also be combined with multiple punching and shearing tools, so that almost any size and shape of article can be turned out under pressures of from 20 to 100 tons. Driven by motor or shafting, these machines are engaged by friction clutch to avoid overload. Operation is simple and mainly by adjustable treadles, and a band brake

automatically stops the ram in any position after disengagement. A special ratchet wheel provides an easy release should the ram seize due to faulty adjustment of tools. Exactitude and uniformity in out-turn are guaranteed and lubrication of all moving parts is automatic. Speeds vary from 12 to 35 strokes per minute according to the size of the machine.

Investor's Pocket List of Reference Tables, 1934. London: Fred. C. Mathieson & Sons, 16, Copthall Avenue, E.C.2. Price 1s.—Investors will find in this handy list a variety of most useful information. A perpetual yield table, a table for calculating yields on £1 shares, stamp duties, contract notes, income-tax at 5s. in the £, fractions of £1 in money and decimals, scale of brokers' commissions, &c., which are given in the list, form a valuable guide to Stock Exchange transactions.

"Mechanical World" Year Book, 1934. London: Emmott & Co. Ltd., 28, Bedford Street, W.C.2. 6½ in. x 4½ in. 362 pp. Price 1s. 6d. net.—Always astonishing value for the money, the *Mechanical World* Year Book has excelled itself in its forty-seventh issue. New sections have been introduced to deal with the technique of sheet-metal pressing, with metallurgical matters, and with machine-tool calculations. The section on internal-combustion engines includes diagrams of the combustion heads and numerous particulars of most of the well-known makes of compression-ignition or diesel engine. Mathematical, steam, and other tables are provided, together with the usual body of general information, while a diary and pages for memoranda are to be found at the back.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of Correspondents)

Speed and the Permanent Way

Great Western Railway,
Chief Engineer's Office,
Paddington Station, W.2.

February 6

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—It would seem from the penultimate sentence of the editorial in THE RAILWAY GAZETTE of February 2 on "Speed and the Permanent Way" that no particular importance is attached to irregularities in rail levels of an inch here and there provided the speed of the trains is not more than 80 miles an hour. I am afraid a statement such as this will convey a false impression, and I need hardly assure you that an irregularity of such magnitude would not be tolerated for a minute. Variations of level, even of a quarter of an inch, if occurring close together first on one rail then on the other, certainly would cause very irregular running and might have even more serious results.

Yours faithfully,

R. CARPMAEL

[Our editorial referred to deflections of rail level *under load*—"under 70 or 80 miles an hour trains"—which, we think, do occur here and there at the present time, especially at worn crossings and rail joints.—ED. R.G.]

French Railway Safety

Chemins de Fer de l'Est,
Paris,

February 8

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The pertinent observations contained in your article of January 5 will, I hope, have the influence they merit on public opinion and will correct the considerable errors of judgment passed on the deplorable accident at Lagny. As you so truly state, French railways, and particularly our company, have spent very considerable sums on the development of all types of safety devices, especially since the war.

At the present time our system possesses 1,285 km. of single line equipped with automatic block signalling and our programme for 1934 comprises 220 more. Nothing in the report which has just been made regarding the circumstances of the accident of December 23 supports the theory that the signalling was defective.

Yours faithfully,

RIBOUD,

Le Directeur de la Compagnie

Patentees and the British Industries Fair

39, Victoria Street,
London, S.W.1,

February 9

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In view of the forthcoming British Industries Fair, I wish to draw the attention of your readers, many of whom may be exhibitors, to the danger of taking advantage of Sections 45 (1) and 59 (1) of the Patents and Designs Act.

Under these sections an unprotected invention may be exhibited provided the Comptroller is notified on the prescribed form. An application for patent may be filed for the same invention within six months of the date of the opening of the fair. However, no priority of date is given and anyone seeing an invention may file an application for patent in this country and other countries, and unless the first and true inventor can prove fraud, the applicant will obtain a valid patent.

A well-known patent counsel in his evidence before the Commission presided over by Sir Charles Sargeant, dealt

with this matter and endeavoured to have the sections of the Act strengthened, but without success. The importance of this matter to exhibitors at the British Industries Fair cannot be over-estimated in view of the "International" attendance.

Yours faithfully,

G. DRURY COLEMAN

General Secretary, Institute of Patentees

The Signal Engineer's Department

55, Barrowgate Road,
Chiswick, W.4,
February 9

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Mention is made in your issue of December 29 last to the Signal and Telegraph Engineer's Department being independent of other Railway Departments. In your issue of January 19 your correspondent "Axed" points out that there is a tendency on Colonial railways to abolish the Signal Department and allow other departments to have charge of the work.

Within living memory the Great Western Railway created a separate and distinct department for signalling, with an engineer in sole charge and responsible to the directors. This precedent was adopted by the London Midland & Scottish Railway a few years ago by a similar appointment.

How paradoxical it seems when one hears of British railway officials obtaining high appointments on Colonial and overseas railways attempting to run contrary to the practice taught them by the home railways, especially in view of the fact that most of the Colonial railways are single line systems. These undoubtedly require greater safeguarding than the normal double track more generally in use in Britain.

Yours faithfully,

WM. BUCKINGHAM

Eldon, Monro Gardens,
Harrow Weald,
February 10

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I am writing as an electrical engineer who has been, but is no longer, a signalman and am very greatly perturbed by the article and letters which have appeared in recent issues of THE RAILWAY GAZETTE. To anyone with a modicum of knowledge on the working of railways, it must be apparent that the abolition of the Signal Department is not only a retrograde step but will lead without doubt to a series of disasters with the inevitable loss of life. Surely the Institution of Railway Signal Engineers takes an interest in the wellbeing of the profession which it represents, and is prepared to take definite action to maintain the standard of safety for which signal engineers are responsible.

If inexperienced railway officials are to take over signalling work and yet not become signal engineers, then we can at the best expect failure and delay, with resultant financial loss. To compensate for lack of knowledge, the whole system of signalling will have to be elaborated at huge expense. As any engineer knows, the more complicated a system becomes the greater are the maintenance expenses. One question which Colonial and overseas railways must ask themselves is whether the curtailment or elimination of the signalling staff is an economic proposition, because they must admit that safety should be the predominating factor. I sincerely hope that, to quote "Axed," signalling will continue to "spell safety to railways and all that travel on a railway," and for this I believe the Signal Engineer to be indispensable.

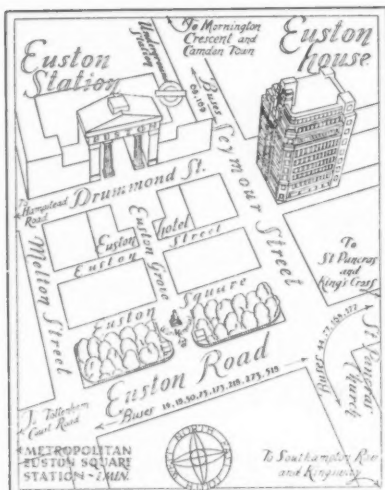
Yours faithfully,

H. S. HIND

THE SCRAP HEAP

EUSTON HOUSE—ITS STORY IN FIGURES
Cubic contents—Nearly 2,000,000
cubic feet.

Total floor area—154,760 square feet.



Materials Used:—

50,000 tons of material handled during construction, including 18,000 tons in demolition and excavation.

Bricks—1,000,000.

Concrete—3,000 cubic yards in foundations; 1,600 tons in filling dis-used lift shafts to old tube station.

	Tons
Cement	3,000
British steel.. .. .	2,030
Lime	100
Ballast and sand	15,000
Bricks, floor blocks, faience, partition blocks and other burnt-ware	2,500
Stone and granite	1,100
Pumice aggregate	400
Asphalt	250
Marble	125
Boilers, radiators, trunking, &c.	200
Joinery, &c.	300
Nails	3
Glass	80
Paint	11
Distemper	2

(See article on page 274)

Villagers on Dartmoor, who are fortunate enough to be served by the railway, eagerly look forward to a train which arrives about noon and brings with it the daily newspapers. One morning while making a journey up to the moors with a friend, writes a correspondent, an old countryman and his daughter got into the carriage at one of the small stations and both expressed surprise and delight on seeing our newspapers lying idle on the seat. The old man then explained how unusual it was to see a newspaper before lunch-time

and told us how that particular train was regarded as *the train* by people dwelling in the surrounding villages, and that its arrival provoked much excitement among the villagers, even though it was a daily occurrence.

Two Polish youths found travelling on the buffers of an engine in France said that they had come from Warsaw on the axles of an express.—*From "The Daily Telegraph."*

The Dickensian Tabard Players presented "David Copperfield" in the courtyard of the George Inn, Borough, on February 10. The inn is used as a parcels office by the L.N.E.R.

The directors of the Liverpool & Manchester Railway are about having the carriages lighted with portable gas. One has been running for the last three weeks with complete success.—*From the "Sunday Times," February 9, 1834.*

TYPISTS ON TRAINS

In 1913 I was in charge of an office on City to City expresses on the old L.N.W.R., when the business of each daily journey comprised not only ordinary commercial matters, but even racing tipsters' love letters and bishops' sermons.—*F. W. Evans, writing in the "News Chronicle."*

A LATE SIGNAL

A man burst into the office of a railway official and demanded that the engine driver of the 12.15 express should be forbidden to blow the whistle

EASTERN COUNTIES RAILWAY,
HIGH STREET, SHOREDITCH, LONDON
COLCHESTER LINE.

Mon. Nat., 1845.[illegible]

omnibuses meet every Train to and from Paddington, by way of Newgate street, Holborn, and Oxford-street, and to and from Regent Circus
 by way of Fleet-street and Charing Cross.

on Sunday mornings. "Why, that's impossible! What leads you to make such an unreasonable request?" "Well, our vicar preaches until he hears the train whistle—and that confounded express was thirty-five minutes late last Sunday!" — *From the "Liverpool Post."*

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

More details of the earthquake in India—Serious flood damage on the Leopoldina Railway—Proposed optical A.T.C. on the Central of Brazil—South African coaching stock improvements—Unusual accident at Japanese station—Importance of Canton-Hankow Railway completion.

INDIA

Railway Budget

The Railway Budget is expected to be introduced in the Central Legislatures during the third week of February. In the original budget for the current year it was estimated that the withdrawal of a sum of about Rs. 780 lakhs from the Depreciation Fund would suffice to meet the interest charges, the usual contribution to the general revenues being suspended during the lean years. Although the revised estimates for the year are expected to show some improvement, there still seems to be little hope of a balanced budget for the coming year. The deficit is likely to be in the neighbourhood of Rs. 6 crores, leaving out of reckoning the contribution to the general exchequer.

Reduction in Fares

An interesting experiment in the reduction of fares for third class passengers was inaugurated on the North Western Railway from December 1 last. The basic rate of fares for distances up to 452 miles was reduced, while a small enhancement was effected for longer distances. During the first week of the experiment there was an increase of 16 per cent. in the number of passengers, attended by a decline in receipts by 3.6 per cent. In the following week the increase in the number of passengers was maintained at 16.3 per cent., while the fares realised dropped by 4.6 per cent. It is understood that the experiment will be continued for six months.

Associated Chambers of Commerce

During his stay in Calcutta the Viceroy opened the annual meeting of the Associated Chambers of Commerce, which was attended by the Finance, Commerce and Industries Members of the Viceroy's Council. The resolutions moved included one requesting the Government of India to direct the Railway Board to review the terms in which railway risk notes are at present drawn up. The wording of these notes should, it recommends, be so amended as (1) to lay upon the railway administrations the burden of proof that loss of, or damage to goods consigned was not due to misconduct on the part of their servants; (2) to ensure that, in dealing with claims for

loss or damage, railways shall not be able to repudiate liability on the strength of endorsement of risk notes at the time of despatch unless the loss or damage is directly attributed to conditions noted in the endorsement; and (3) generally to incorporate the principle that the railway shall be under obligation to give delivery of consignments in the same good order and condition in which they were tendered for despatch. On the suggestion of Sir Joseph Bhole, Member for Railways and Commerce, further consideration of the resolution was postponed pending the receipt of answers from the railway administrations to the communication on the subject, addressed to them by the Railway Board.

Stimulating Railway Travel

An effort is being made by the Bombay, Baroda & Central India Railway to encourage railway travel among the student community of Northern and Central India. A lecturer has been appointed to visit various schools and colleges and address students on the historical, religious and social aspects of Rajputana.

More Details Connected with the Earthquake

It now appears that the large bridge previously reported* as having two spans collapsed, is the Inchcape Bridge between Ballia and Chapra and the remainder of the Chapra branch is also seriously damaged and entirely closed to traffic. In addition the Bur Gandak bridge between Samastipur and Khagaria is damaged, and, moreover, traffic between Bansi and Bhaptiahi and between Sonapur and Mozufferpore has been suspended. On the Eastern Bengal Railway, the Katihar-Purnea-Jogbani and Murliganj and Behariganj branches have been rendered unsafe for the passage of trains owing to wrecking of the track, bridges and culverts. The transshipment of passengers and goods is at present impossible. At Jamalpur, E.I.R., 130 out of the 150 larger bungalows in the railway colony collapsed. All work in the railway workshops is suspended, and, as a result of the collapse of the station buildings, it was temporarily necessary to suspend the running of trains through the

* See news paragraphs in our issues since the earthquake—[Ed. R.G.]

station. One platform line has since been cleared and trains are now being allowed through. The railway colony at Jamalpur suffered 17 fatalities and 41 of the 48 persons injured are described as serious cases. Sir Hugh Hannay, Agent of the East Indian Railway, is personally looking into relief measures. Tents have been obtained in large numbers to house railway employees whose quarters have been destroyed, and food and medical relief have been brought into Jamalpur with commendable promptness.

BRAZIL

Railcars on the Mogyana Railway

By way of an experiment, the management of this railway inaugurated on January 1 a daily railcar service (Sundays excepted) from Amparo (an important station on the Socorro branch, which leaves the main Mogy-Mirim and Ribeirão Preto line at Jaguary) to Campinas. For the present, one service only is to be run, leaving Amparo at 6.50 a.m. and reaching Campinas (65 km.) at 8.45 a.m., connection there being made with the Paulista Railway's express due away at 9.08 a.m. and into São Paulo at 10.58. One class only is carried, and fares are based on the existing second-class fare by ordinary trains, no return tickets being issued.

Sorocabana Railway New Line

It is announced in São Paulo that in May this year the Mayrink-Santos section of the above railway will be opened to traffic. Dr. Gaspar Ricardo, the Manager of the Sorocabana, stated that the tunnelling work had been completed, and that only certain lengths of platelaying and girder erection now remained to complete the line. There is very little doubt that, once the new link with Brazil's principal coffee-port is opened, the bulk of the traffic emanating from the zones served by the Sorocabana itself and by the E.F. Noroeste will, instead of being handed over to the São Paulo Railway at the interchange points in Jundiáhy and São Paulo (Barra Funda), be transported direct to Santos, the British company accordingly suffering heavy freight losses.

Leopoldina Railway

The Leopoldina Railway suffered seriously from the recent extraordinary rainfall, by the flooding of low-lying sections and by landslides and slips. Some of the stretches most affected were those between Itapemirim and Victoria (159 km.), Ponte Nova and Caratinga (190 km.), Carangola and Manhuassú (188 km.), and Espera Feliz and Itapemirim (146 km.); so completely blocked was the stretch between Carangola and Manhuassú that for 18 days no trains could be run. Twice trains were struck by landslides. On the first occasion a Rio-bound passenger-train was hit just after it had

left Petropolis, the passenger-coaches themselves escaping, but the baggage-van being knocked over and resulting in the death of a railway-employee. Shortly afterwards a goods-train met with similar trouble near Magé (just over 50 km. from Rio), no casualties occurring, but the engine and 10 of the wagons suffering considerable damage.

Proposed A.T.C. on the Central Railway

As a result of a serious accident which occurred three months ago at Mangueira, when a stationary suburban train on the Dona Clara route was run into by a following train during the evening rush-hour, resulting in several deaths and injuries, it has been decided to abolish the Adel system of automatic signals on the suburban lines in question. These signals are normally in the "off" position, going to "danger" and reverting to "clear" again by means of treadles actuated by the train in advance, and at the enquiry into the cause of the accident the balance of the evidence went to show that it was possible, in consequence of a failure in the electric circuit, for a "clear" indication to be given with the track occupied ahead. Ordinary signalling, in combination with track-circuiting, will therefore be installed, at any rate as a provisional measure, until the projected electrification is completed, when colour-light signals—which at present are in use on certain sections of the main and outer-suburban lines between Dom Pedro II and Belém—will be adopted generally.

In this connection, the adoption of a system of automatic train-stop is also being seriously considered. It consists of beams of light projected from the front of the engine, and, on arriving at a stop-signal in the danger position, the beams strike an arrangement of mirrors, and are thence reflected on to a part of the engine where there is installed a photo-electric cell, which in its turn brings into action electro-mechanical transmission-gear connected to the engine-brake.*

SOUTH AFRICA

Improved Rolling Stock

It may be recalled that in March last a disastrous fire occurred at the Salt River workshops, resulting in 62 vehicles being wholly or partly destroyed. Consequently, it became necessary to place in traffic at the earliest possible moment at least 28 new main line saloons in replacement of some of those burnt. The construction of these vehicles departmentally was authorised on March 11 last. Drawings and schedules of material were prepared for three distinct types of saloon and four workshops were entrusted

with the work, Durban, Bloemfontein, Uitenhage and Pietermaritzburg. The last of the 28 coaches was placed in service on December 20. In addition to these saloons, 14 similar ones had already been authorised, and the building of these was undertaken concurrently. The last of the 14 was also placed in service before Christmas. The time taken to construct these vehicles constitutes a record for coach building in South Africa.

The new saloons are designed on modern lines providing greater space and more comfort for passengers by adding six inches to the width as compared with older coaches of similar type. Entrances are at the ends as usual, but, instead of the open balcony, closed vestibules are provided, ensuring greater cleanliness and protection when travelling. The corridors are wider and run down on one side of the coach instead of crossing over midway from one side to the other. On the corridor side of the compartment small windows have been provided to permit passengers to look out without having to leave their seats and stand in the corridor. These windows are provided with sliding shutters of a neat design which can be closed when privacy is desired. To reduce track and running noises to a minimum, a double floor with insulating material between floors has been fitted. The latest practice in electric lighting is included. In addition to the central group of three globes and the pair over the washbasin, upper and lower berth lights are an added feature. The underframes are of a new standard design to carry the wider body, and are mounted on an improved bogie, embodying new features in springing, &c., thus providing for steadier riding of the vehicle.

JAPAN

Increase of Tourists

For some years the high exchange rate of the Japanese yen has reacted against tourist traffic, but with the return to a more normal figure more visitors visited Japan last summer and the large number of beautiful seaside resorts were crowded. The hotels added to the success of the season by catering for the public both efficiently and on reasonable terms. The result of the efforts of the shipping companies, the railways and their agencies and the hotel proprietors to please the public, added to the natural charm of the country, is shown in the increased number of visitors in 1933 over 1932. Over 25,000 tourists visited the country in the year, an increase of between 6,000 and 7,000 over 1932.

Extraordinary Accident at Kyoto Station

An unusual disaster occurred at the railway station at Kyoto on January 8. Before the departure of a special train conveying naval recruits from Kyoto to the Naval Base at Kure some thousands of relatives and friends

arrived at the station to bid the recruits farewell and as the gates were opened an excited crowd surged through on to the platform. Within a few minutes a number of those who reached the platform first were swept over the edge on to the railway tracks. Before anything could be done wave after wave was forced over the edge on to them by the surging crowd that followed, unaware of what was happening in front, and it was some little time before those behind could be made aware and their progress checked. About 70 men, women and children were trampled to death and another 60 to 70 were injured.

CHINA

Locomotives and Rolling Stock

The question of a further loan from the Boxer Indemnity Funds to the Ministry of Railways of the National Government of the Republic of China is under consideration by the Boxer Funds Board. It is understood that the loan is required for the purchase abroad of six locomotives and 33 coaches.

New Railway Branch for Anhwei

The Tientsin-Pukow Railway Administration is contemplating the construction of a branch line from Pengpu to Chengyangkwan, a distance of approximately 100 miles. Survey work in Northern Anhwei for the projected line is being undertaken by the Tientsin-Pukow Railway Administration. The new railway would be single track and standard gauge.

Passports for Passengers by Aeroplane

It has been ruled by the Ministry of Foreign Affairs of the National Government that foreign passengers going into the interior by aeroplane must be in possession of passports or other authority from the Ministry, before being allowed to proceed, and air lines are instructed not to issue tickets to intending passengers until the necessary authority to travel has been furnished.

The Canton-Hankow Railway

The importance of completing the Canton-Hankow Railway by the construction of the intervening 230 miles forming the gap between the northern and southern sections at present open, may be gathered from the fact that the completed line will link up Hongkong with Peiping and so via Manchuria with Europe. The isolated group of lines round Canton will also be connected with the rest of the Chinese railway systems, one continuous north-south trunk line then running the whole length of China intersected at Chenchow by another from east to west and fed by numerous branches. At present the 230 miles have to be covered partly by motor bus and partly by chair or mule transport.

* An optical train control such as this was described and illustrated in the January, 1934, issue of our contemporary *The Railway Engineer*—[Ed. R.G.]

THE NEW BRUSSELS - GHENT LINE, BELGIAN NATIONAL RAILWAYS

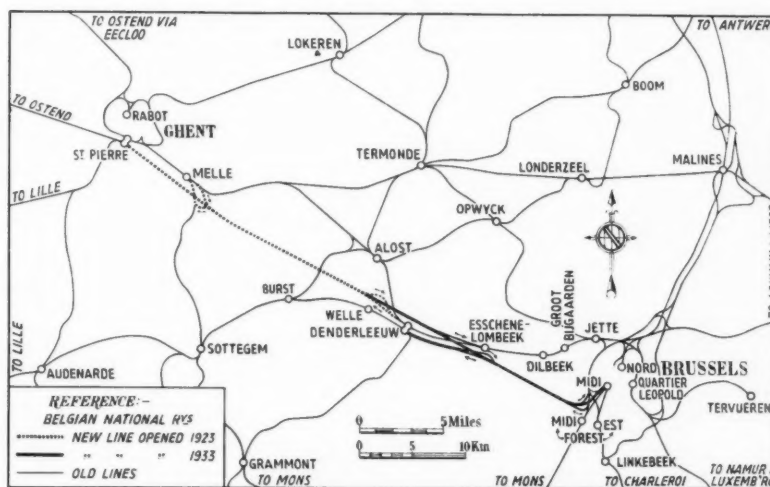
Completion last year of the Brussels-Denderleeuw section has made available a direct line designed for high speed service

PROPOSALS for making a direct line between Brussels and Ghent, to avoid the circuitous route via Dilbeek and Alost, were made as long ago as 1900, and in 1907 the plans for one were accepted by the authorities. The principles governing the arrangements as planned were to secure easy gradients and curves, except in the immediate neighbourhood of Brussels where it is more difficult to obtain them, and to avoid level crossings and stations. Junctions were to be provided, however, with the old line at three points, namely, at Brussels, near Denderleeuw, and near Ghent. By 1914 the civil engineering works for the Denderleeuw-Ghent section were completed, but after the war nothing further could be done for some time. As at first planned the provision for connections between the old and new lines at Esschene-Lombeek and Denderleeuw was to be such that trains to Ghent had still to pass through Denderleeuw; those in the reverse direction could not, but passed to the north of the station to reach the junction at Esschene-Lombeek. Later on, upon completion of the new road bed at Welle, another connection on the north side was laid in and it became possible to make use of the line for running in either direction between Ghent and Denderleeuw as from June 1, 1923.

In 1926 work on the remainder of the line was begun and pushed forward as rapidly as possible. It leaves Brussels from the Midi station and is connected by a flyover junction with a connection from Forest Midi and from the western part of the Brussels circle line. At Esschene-Lombeek again, 18 km. from the terminus, another flyover junction communicates with the old route into Denderleeuw. There are parallel lines from the junction to that station, the new pair being on the south side. The whole line, shown on the accompanying map, was opened on April 4, 1933, but the short piece from the Esschene-Lombeek flyover to Welle had been in use for about twelve months previously.

The gradient profile of the route shows how irregular the configuration of the land is, and, although the avoidance of level crossings did not in itself offer any special difficulty, the engineers had to solve quite a number of problems in order to build the line, a great many bridges, some quite large, being necessary. The line commences at Brussels in the valley of the Senne and crosses the

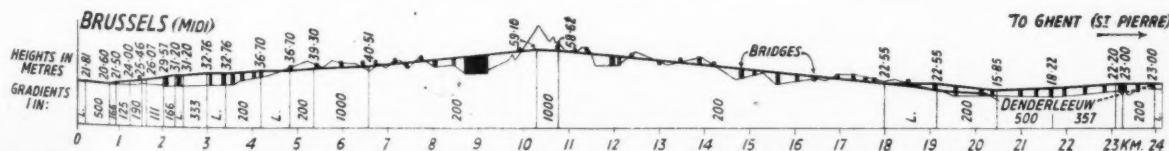
Dender at Denderleeuw, both rivers being tributaries of the Scheldt. The highest point on the line is reached between Km. 10 and Km. 11, where it passes through a 25 m. cutting, forming the watershed between the two streams referred to, crossed by the old line between Groot Bijgaarden (Grand Bigard) and Dilbeek. Just before that point, however, the Pede is passed over, only a small river but necessitating the construction of a viaduct 20 m. high and 522 m. long. This is not the lowest point of ground along the route, but there is no other valley so deep, nor one followed so immediately by high ground, as is this one.



Sketch map of lines between Brussels and Ghent, showing sections of new route opened in 1923 and 1933 and arrangement of flying junctions near Denderleeuw

The line is laid on a sand and clay formation, containing much water in places, so that comprehensive arrangements for drainage had to be made. Nevertheless, some difficulty with slips has been experienced on the embankments in places. The permanent way consists of rails weighing 50 kg. per metre (100 lb. per yd.), 18 m. (59 ft.) long, carried on 31 wood sleepers. Standard Belgian three-position semaphore signalling, mechanically operated, is installed, worked from cabins fitted with lock-and-block apparatus. The cost of the complete line is given as 30 million gold and 120 million post-war francs.

We are indebted to our contemporary *Spoor- en Tramwegen* for the above particulars.



Profile of new high-speed line between Brussels and Ghent

COLOUR LIGHT SIGNAL ASPECTS

(See diagram opposite)

BY the courtesy of Mr. H. H. Mauldin, Superintendent of the Eastern Section, Southern Area, London & North Eastern Railway, we are enabled to present herewith a diagram, issued to trainmen in connection with the opening on October 23 last, of colour light signalling between Gidea Park and Brentwood, that shows the meanings of the three-aspect and the four-aspect signals.

The three-aspect signals have the usual three colours of red, yellow and green, which respectively intimate "stop"; "proceed, prepare to stop at next signal"; and "proceed." Three-aspect signals imply that there is full braking distance between one signal and the next in its advance. For those situations where the full braking distance does not exist between two consecutive signals, the four-aspect type are used, therein. The next signal in the rear of one exhibiting red still has a yellow light, but it is supplemented by a double yellow on the next signal in the rear. The same meanings as above apply to the red, yellow and green, whilst that for the double

yellow is "proceed; pass next signal at restricted speed."

In the upper part of the diagram are shown the various aspects for full braking distance, shown by five successive signals for train No. 2 when train No. 1 is standing under the protection of the fifth signal. In the lower part of the diagram the conditions applicable to less than braking distance territory are shown for train No. 2 when, again, train No. 1 is standing under protection of the fifth signal.

At the foot of the diagram are shown the interesting conditions that prevail for an experimental period at the facing junctions between Gidea Park and Shenfield in order to secure a reduction of speed when a diverging movement is being made from one parallel line to another. Even when the junction signal for that movement is at green, the double yellow remains exhibited in the signal in the rear. Since the meaning of the double yellow is, as we have said, "proceed; pass the next signal at restricted speed," obedience to that instruction secures the required reduction of speed for a diverging junction.

U.S.A. Rail Specification and Classification

LAST year a new standard specification for rails rolled from open-hearth steel, which had been approved by the American Railway Association, was adopted by the American Railway Engineering Association and brought into use. Actually the new specification is practically identical with the last previous standard, dated 1925, in all respects but the analysis of the steel. As previously, the carbon and manganese limits vary, according to whether the rail weighs from 70 to 84, 85 to 100, 101 to 120, or 121 to 140 lb. per yd., but certain modifications have been made in these limits. The most surprising feature of these analyses, however, is that, despite the almost world-wide consensus of opinion as to the value of manganese as a toughening agent, and the risks of high carbon contents as encouraging the formation of the transverse fissure defect in rails, which has become so troublesome on American railroads, American engineers continue to pin their faith to almost unchanged proportions of these two elements in their rails. For example, in rails of 100 lb. per yd. weight or less, manganese is not permitted to exceed 0.90 per cent. (as compared with the British limits of 0.90 to 1.10 per cent.), while rails from 85 to 100 lb. per yd. must contain from 0.64 to 0.77 per cent. carbon. In the case of rails weighing 121 to 140 lb. per yd., from 0.69 to 0.82 per cent. carbon is demanded (the previous figure was 0.72 to 0.89 per cent.; the British maximum, with medium manganese, is 0.60 per cent.), in association with 0.70 to 1.00 per cent. manganese.

It is not surprising, in these conditions, that the severity of the American tests falls short of the tests imposed on British rails. The American falling weight test is conducted with a tup weighing 2,000 lb. as compared with the British 2,240 lb.; the test-lengths of rail are laid on supports 3 ft. apart (except in the case of rails of over 121 lb. per yd. weight) as compared with 3 ft. 6 in. in Great Britain; and the height of fall on to a rail of 100 lb. section is but 19 ft. in the U.S.A. as compared with 22 ft. 6 in. in this country. Three falling-weight tests are made on every American cast, together with an impression test, but no tensile test. It is doubtful if the British falling weight impact could be sustained without fracture by rails of these American analyses, or if the minimum percentage

of extension specified in the B.S. tensile test could be obtained. American manufacturers, despite a standard rail length of only 39 ft. compared with the British 60 ft., are permitted to supply 11 per cent. of the contract tonnage in shorter lengths, to permit of the cutting back to sound steel of rails found defective in the ends only; but in Great Britain 7½ per cent. of the contract tonnage is found adequate for this purpose, the smaller percentage on a longer rail length inferring that defects are less frequent in the British product. Further, a tolerance of ⅜ in. in length, long or short, of the American 39 ft. rail compares unfavourably with the tolerance of only ⅛ in. up or down on the British 60 ft. rail.

There are, however, some useful features about the way in which American rails are classified after acceptance. In Great Britain, apart from the use of special alloy steels or heat treatments, only one quality of steel rail is recognised as acceptable from the mill at the contract price, and this must be, so far as manufacture and inspection can ensure it, perfect. In America, however, standard specifications are framed in such a way as to cover percentage acceptances of various qualities, each of which must be distinguished by special painting. On all American rails figures and letters are stamped in the web indicating, not merely the cast of steel from which a rail has been rolled, but also the ingot number, and the position in the ingot from which the rail has been cut. All "A" rails, from the top of the ingot—which is generally of the poorest quality—must be painted yellow on the ends, and loaded separately. Rails of which the carbon comes within the upper five points of the carbon range for that particular weight of section are painted blue on the ends. Eight per cent. of any contract will be accepted in "No. 2" rails, painted white on the ends, which are rails with slight defects unlikely to have any seriously adverse effect on their service. Then there are "X-Rays," painted brown on the ends; these are all the top rails from ingots whose falling weight test-pieces, when fractured, have shown piping, laminations, or other defects. The value of this distinctive painting is that it enables the user readily to select the best rails for the hardest and most responsible service in the track.

THREE AND FOUR ASPECT COLOUR LIGHT SIGNALLING, L.N.E.R., GIDEA PARK—SHENFIELD

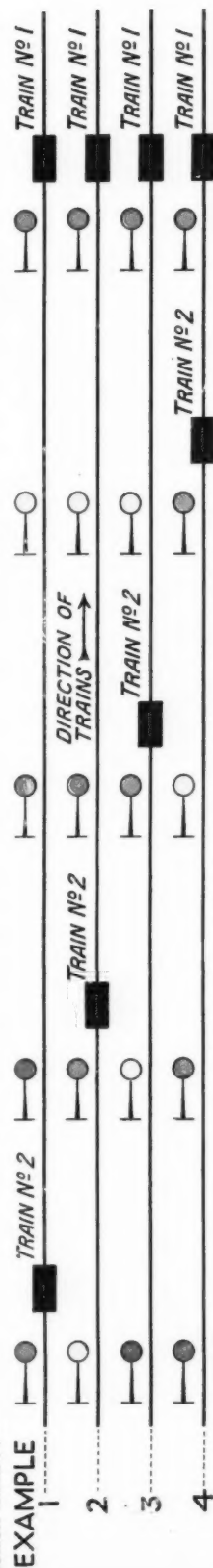
Each three aspect colour light signal consists of one lamp which will display either the Red, Yellow, or Green aspect.
Each four aspect colour light signal consists of two lamps, and the lower lamp will display either the Red, Yellow, or Green aspect, the top lamp showing Yellow when necessary to display the Double Yellow aspect.

THREE ASPECT COLOUR LIGHT SIGNALS

ASPECT :— Green
Yellow
Red

MEANING :— Proceed
Proceed, prepare to stop at next signal
Stop

The following examples show the working of colour light signals in relation to the movement of a train over a section of line with a previous train in a section ahead :—



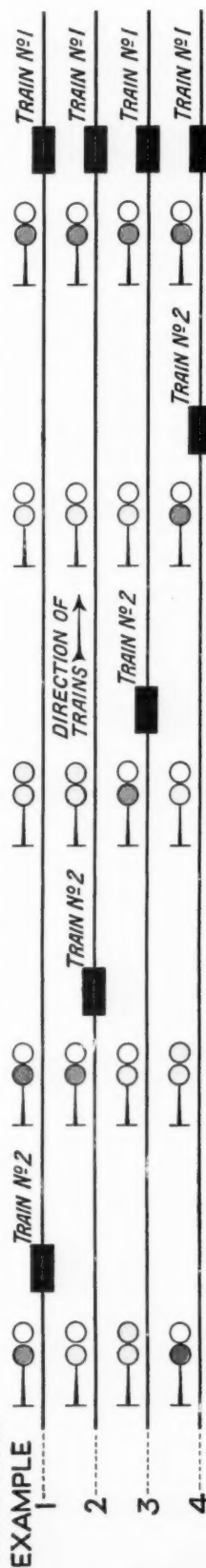
FOUR ASPECT COLOUR LIGHT SIGNALS

Provided to enable a Double Yellow aspect to be shown where there may be less than full braking distance between the Single Yellow and the Red aspects for certain classes of trains.

ASPECT :— Green
Double Yellow
Yellow
Red

MEANING :— Proceed
Proceed, pass next signal at restricted speed
Proceed, prepare to stop at next signal
Stop

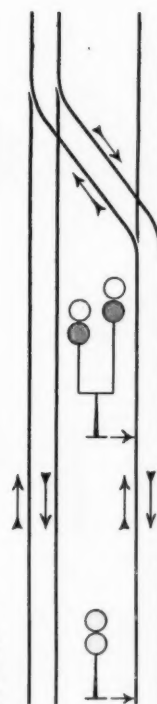
The following examples show the working of colour light signals in relation to the movement of a train over a section of line with a previous train in a section ahead :—



DIVERGING JUNCTION SIGNALS

At diverging junctions the signal next in the rear of the junction splitting signals will, in addition to showing Double Yellow when the junction splitting signal for the straight road is showing Yellow, also show Double Yellow when the junction signal is "off" for a diverging movement as shown alongside.

The Double Yellow aspect in the colour light signal next in rear of the junction splitting signal will be shown both in the case of colour light junction splitting signals and semaphore junction splitting signals.



Sir Vincent Raven, K.B.E.

Sir Vincent Litchfield Raven, K.B.E., whose death we record in our personal columns this week, was born in Norfolk and educated at Aldenham School. After a pupilage to Mr. Fletcher, Locomotive Superintendent of the old North Eastern Railway, he remained on that line, gaining wide and varied experience until appointed Assistant Mechanical Engineer about 1895. In 1910 he became Chief Mechanical Engineer, the position he held until 1923, when the N.E.R. became merged in the L.N.E.R., and he was appointed Chief Technical Adviser to the latter company. He retired in the following year. During the war he was Superintendent of Woolwich Arsenal, receiving the honour of K.B.E. in 1917, and in that year was appointed Deputy Controller of Armament Production. In 1924 Sir Sam Fay and Sir Vincent Raven went to Australasia to inquire into and report upon the working of the New South Wales and of the New Zealand Government Railways. In the following year Sir Vincent visited India as Chairman of a Committee of Technical Experts, to report upon the capacity of State Railway workshops and advise upon their reorganisation. A Member of the Institutions of Civil and Mechanical Engineers, he was Vice-President of the latter in 1924: he was also a Member of the British Engineering Standards Association Main Committee, and of the Iron and Steel Institute.

His policy as Chief Mechanical Engineer of the N.E.R. was remarkable for the large number of three-cylinder-simple types of locomotive he designed and built, including 4-4-2, 4-6-0, 4-6-2, 4-4-4T., 4-6-2T., and 0-8-0 wheel arrangements. He also equipped 4-6-0 and 4-4-2 type locomotives with the Stumpf uniflow method of steam distribution which is designed to avoid any return or backward motion of the steam from the time it leaves the boiler until its release after completing its work in the cylinders. In THE RAILWAY GAZETTE of March 14, 1913, this system was illustrated and described.

It is remarkable that his Z class 4-4-2 locomotives, the first of which was built as long ago as 1911, are still handling many of the important East Coast expresses. A tribute to their general excellence of design is given by the fact that one of these engines—designed 23 years ago—has just been rebuilt with new cylinders having R.C. poppet valves, and it seems probable that thus equipped, the class will have a greatly prolonged lease of life in express service. Moreover, his confirmed advocacy of

the three-cylinder principle, using high pressure steam in all cylinders, appears from the modern trend of L.N.E.R. design to have been fully justified. That all the most successful modern types of locomotive on that system are three-cylinder simples, is also a significant testimony to the general principle to which Sir Vincent was wedded. His locomotive designs were for the most part characterised

by boldness of outline, simplified detail, and presented an appearance of bigness rather in advance of their time. He made full use of the permissible axle loadings, but the three-cylinder arrangement kept the hammer blow low. His engines were notable for well-planned boiler characteristics and other features making for success in hauling heavy trains under difficult conditions.

The comfort of the enginemen was also a matter which he considered to be of the first importance, and especially so because of the rigorous climatic conditions prevailing in the North. Somewhat incisive in manner he was nevertheless of kindly disposition and, as we found in the course of many conversations in his office, he was always ready to grant us such facilities as were desired in connection with the preparation of articles on locomotive and workshop subjects.

During the later years of his regime at Darlington, he was identified with electric traction, and in 1921 he designed and constructed a powerful electric express locomotive for trial pur-

poses in anticipation of the materialisation of main line electrification, in addition to his numerous electric goods locomotives for the Newport-Shildon line. A certain amount of criticism was levelled at him for having produced the electric express engine at a time when the opportunities for trying it out under appropriate conditions were virtually non-existent. He, however, held that this was the best way to stimulate interest in a development that held such enormous possibilities as electric traction, about which he held the most optimistic views. The design was a remarkable one in every way, and was greatly admired by the foreign engineers who visited this country for the especial purpose of inspecting it. In 1921-22, Sir Vincent read two important papers upon "Railway Electrification" and "Electric Locomotives," the former before the North East Coast Institution of Engineers and the latter at the Institution of Mechanical Engineers. The first installation of electric dock cranes in England was carried out under his supervision at Middlesbrough after he had studied foreign practice.



The late Sir Vincent Raven, K.B.E.,

Chief Mechanical Engineer, North Eastern Railway,
1910-1923

THE HISTORY OF THE MECHANICAL LOCKING FRAME

Abstract of Presidential Address by Mr. Ralph S. Griffiths to the Institution of Railway Signal Engineers, on February 14

The first concentration in a single control of the operating connections was limited to signals, as these would normally be situated at greater distances apart than points, and, since from such position the signs to be given to a driver were operated, there arose the necessity to ensure that such indications should never result in a collision. The first attempt to meet this requirement was made by Sir C. H. Gregory, at Bricklayer's Arms Junction, by means of a series of stirrups to which the signal connections were attached, simple interlocking being provided. It is generally agreed that Mr. John Saxby, at one time, I believe, employed on the railway at Brighton, and an original partner in the firm of Saxby & Farmer, was the first person to put together in one row the levers for working points and signals; this was in 1856. The signals had hand quadrants as well as levers, both being interlocked with the point levers. The frame operated a double junction—2 points, 4 homes—and the cabin was built round these home signals.

In 1860 Mr. Austin Chambers produced a frame combining Gregory's stirrup frame with point levers. The interlocking was arranged by means of spigots fitted to the stirrups, which entered holes in plates connected to the point levers. One such frame was, I believe, manufactured by Stevens & Sons and installed at Willesden Junction. In the same year John Saxby patented a form of interlocking comprised of levers pivoted at one end and formed at the other end into hooks or bevels. Frames with this type of interlocking were installed at Victoria (Hole-in-the-Wall box), Cannon Street, Charing Cross, and Brighton. In 1864 Mr. Tate produced a locking frame employing two wires for each signal, and claimed in his patent "weights and levers at the signal post may be dispensed with."

Early Forms of Locking Frames

Mr. W. Jeffreys' patent of 1865 is typical of early interlocking ideas, namely, just a preventive to pulling. It was in no sense interlocking as we understand it; Mr. Hill, in 1866, was the first to stand the signal levers centrally and to work two signals off one lever by push and pull operation. The interlocking was operated by counterweights. Other patents in 1866 were one by McKenzie, Clunes & Holland, employing a cam actuated by a stud on the lever, the first of a series of cam-actuated frames by this manufacturer, and one by Livesey & Edwards, of locking bar fame, in which the interlocking was a series of loop-ended levers which passed over the actual lever handle. Typical of progress was a patent granted to Jeffreys, Livesey & Edwards for "back lock apparatus"; the object was stated to be "to ensure that, when a lever is pulled over to release a second lever, the first one shall not be replaced until the second lever is first replaced."

The next period may perhaps be considered the seven full years—actually from 1867 to 1875—as during this period a large number of patents was taken out, many of the principles being still in use. These are covered by a yearly summary:—

1867.—Saxby & Farmer introduced improvements in wedge locking. Mr. Easterbrook's first patent was granted, employing an extended catch rod to actuate the locking. Cariss obtained a patent for a locking tray or box, which he described as "a box vertically or horizontally, having channels in which locking bars are fitted. These channels may be of different widths and vary in depth, so as to permit of the requisite variations in, and combinations of, notched bars." This was not unlike a description of a present day locking box, and yet tappet locking had not been invented. Mr. F. Brady, one time Chief Engineer of the South Eastern Railway, took out his first locking frame patent.

John Saxby's first patent, employing an extended catch rod to actuate the locking was obtained. This was followed by Easterbrook's reply and second patent employing two catch rods per lever—both extended—and John Saxby's

patent, employing the catch handle, to actuate locking fixed behind and level with the top of the lever. It may be noted here that Easterbrook and Saxby were the two advocates of catch-handle locking, each attempting to establish a patent right to it, and very frequently fighting it out in the Law Courts with varying result.

1868.—Mr. Easterbrook secured a patent employing both the extended catch rod and the lever.

1869.—Mr. R. C. Rapier entered the field with a frame employing a series of obstructing discs on the pulling side of the lever. Of more curious interest, however, was Mr. Baines' invention of this year employing sand or oil as a time release on the interlocking. The object was to ensure that, after the signal lever was replaced to normal, a given period of time should elapse before the point levers, working points affecting the route over which the train had been signalled, could be moved.

1870.—This year was made memorable as Stevens & Co. patented their tappet locking. It is surely a great tribute to these inventors of 64 years ago that to-day their method is the one universally practised. In the same year a Mr. Smith patented a locking frame employing a series of foot plungers, one for each lever; these foot plungers were interlocked, and, when depressed, released their respective levers. Mr. Rapier also produced his aptly named "beer engine" frame, one such frame of 80 levers being installed at Retford Junction to control the crossing on the level of the Great Northern Railway by the Manchester Sheffield & Lincolnshire Railway. In addition, during this year Mr. Buck produced a locking frame.

1871.—Mr. John Saxby produced his celebrated rocker actuation, first with only one slot in the rocker, and subsequently with two slots in the rocker. This actuation is still largely employed and, among others, by the Midland type of frame. Mr. S. T. Dutton produced a frame, the levers of which had two strokes in one direction; the first stroke operated the points, the second stroke the signal. Two catch handles were fitted, one for each stroke.

1873.—Mr. A. R. Poole patented a frame in which each lever was jointed between the handle and the fulcrum. The portion above this joint could be moved sideways, this sideways movement actuating the locking. When the handle and lever were in the same straight line, the lever could be pulled over. McKenzie & Holland also took out patents in connection with their cam actuation.

1874.—Saxby produced his celebrated grid locking, actuated by a one-slot rocker. This frame became perhaps the greatest medium for arousing world-wide interest in British signalling practice. Frames of this design have been employed in nearly every country where railways exist. Typical examples of this frame were London Bridge (240 levers in two rows back to back) and Brighton with frames of 240, 120 and 92 levers installed about 1880 and in operation for some 50 years. In this year also Bailey produced a frame somewhat on the principle of Stevens' tappet, in which the member connected to the lever had a cam on its under-side and drove bars which formed the locks.

1875.—It may here be of interest to recall that in 1875 Mr. Rapier read a paper before the Institution of Civil Engineers entitled "Fixed Signals." Part of this paper was devoted to the interlocking frame, and in the subsequent discussion, Mr. Farmer, of the firm of Saxby & Farmer, stated that he had "a list of 92 patents for locking frames taken out by various individuals from 1856 till that date (1875)." Included in this total, and not already mentioned, were several by Mr. F. Webb, Chief Mechanical Engineer of the London & North Western Railway, from which the standard L.N.W.R. frame was evolved. Then there was Mr. Stevens' patent for a frame of curved construction. It was claimed that "the frame might make a circle or an ellipse of levers, the signalman being in the centre." This patent of over 60 years ago disposes of what is, I believe, the generally accepted view that the building of a locking frame

other than in a straight row is a Continental development. I am informed on reliable authority that one such frame was built and installed on a British railway. When it is remembered that the interlocking would be mechanical, namely, tappet locking, probably of this firm's 1870 patent, it will be admitted this was a surprising achievement.

By this time two principles of locking actuation had become established: first, actuation by some means, usually the catch handle, prior to the movement of the lever, and generally known to-day as "catch handle locking"; and secondly, by the movement of the lever itself known as "lever locking." The latter method must be subdivided into two methods of accomplishment: (a) by attaching the locking member direct to the lever, resulting in the locking member, or tappet, having a continuous movement throughout the lever movement; and (b) by introducing some mechanism between the actual lever and its locking member, resulting in the locking member being actuated at the commencement of the lever movement, then a period during which the locking member is stationary, and a second movement of the locking member during the last portion of the lever movement. Examples of these already referred to are catch handle locking, in Saxby's rocker; direct lever locking, in Stevens' tappet; indirect lever locking, in McKenzie & Holland's cam type. Examples of the combination of both catch handle lever locking in the same interlocking frame will be described later, though actually Easterbrook produced such a frame.

Cessation of Patents

It would appear that Mr. Farmer's statement of the large number of patents already in existence acted as a deterrent, as there followed the "seven lean years"—actually from 1875 to 1886—when only some six or seven patents were applied for. Among these was one by Mr. George Edwards, who subsequently became Managing Director of the Railway Signal Company, which was for a cam actuation not unlike the McKenzie & Holland design.

By 1887 Stevens & Co.'s patent for tappet locking had expired, and this method of interlocking became almost universal. In this year Mr. Dutton took out a patent for a time release, employing oil or other suitable liquid, and including a scheme of automatic completion of lever stroke, which doubtless explodes another theory, namely, that "stroke completion" originated with the introduction of power signalling. For succeeding years the summary method will again be adopted:—

1888.—This year saw the introduction of Saxby & Farmer's Duplex, employing the catch handle and the lever, the tappet operated by the catch handle acting as a notch blinder during stroke.

1889.—Dutton devised his pivoted handle frame which acted as catch handle and locking actuator. The handle was so pivoted as to rock in the same direction as the lever; it was first pulled until in line with the lever, then the lever was pulled over, and, finally, the handle rocked over in the same direction as the previous movement to complete the locking and lower the catch.

1890.—O'Donnell & Timmis' toggle jointed catch rod was introduced. It was followed later by Atkinson's patent with a similar movement.

1892.—The Simplex frame was developed out of Russell's two levers in one quadrant slot.

1893.—Dutton's catch handle frame was introduced in which the lever was fulcrumed at its extreme end, and the operating connections attached to the bend of the lever. A frame of this type was, I believe, recently installed near March, on the L.N.E.R., in connection with the Whitmoor hump yards. A somewhat peculiar frame employed on the Great Western Railway was the twist locking frame; the date of its inception I have been unable to confirm.

A Period of Inactivity

A further period of inactivity of about twelve years followed, until, in 1905, Sykes produced a frame employing a curved rack and toothed wheel to actuate the locking, followed two years later by Hallam & Sykes' frame with a similar action.

1908.—This year saw the production of Brettels' frame with two tappets at different distances from the lever fulcrum, and, therefore, having different strokes.

1911.—Saxby's double-wire frame was employed in South

Africa, with a subsidiary small lever to actuate the locking. The latest double wire frame manufactured by the Westinghouse Brake & Saxby Signal Company, and also the company's latest type of catch handle frame, are of such recent date as to be well known.

In passing, it is of interest to note that on the British railways to-day all three methods of actuation are in general use. The L.M.S.R. uses the catch handle method, employing the rocker; the G.W.R. the indirect lever method, embodying a cam plate; and the L.N.E.R. the direct lever method.

As previously stated, I have attempted only a history of the mechanical frame itself, but quite as interesting a record could be compiled of the development of the power frame and combinations of power and mechanical levers or slides in one frame. Such a record might also include descriptions of the many forms employed for interlocking the fixed signal system with the space interval system.

First Electro-Mechanical Working

I would, however, mention that what I believe to be one of the first applications of electro-mechanical working was that supplied and installed by W. R. Sykes in the year 1874 on the Metropolitan District Railway, at Mansion House station. It consisted of a series of key-switches operating electric shunt signals. These key switches were fixed above the levers of the mechanical frame and the keys were mechanically interlocked with the necessary point levers. Each key stood normally vertical, and, when turned "clockwise" operated signals authorising engine movements from left to right. When turned "counter clockwise" it operated shunt signals authorising engine movements from right to left. Thus, the principle of indicating the direction of authorised train movement by the direction in which the controlling switch is turned, which is to-day employed on the C.T.C. control panel, is really an adaption of the method employed as far back as 1874. The C.T.C. panel is the most revolutionary substitute for the interlocking frame. While still believing that a controlling machine must ever form a part of every complete signalling system, I include the C.T.C. panel at Wembley in my summary as I feel it does very clearly indicate the trend of events.

It must, perhaps, be acknowledged that the purely mechanical frame has passed the zenith of its usefulness in its present form, and we may look for changes, by the substitution of electrical for mechanical interlocking. In consequence, its form may also vary from the present straight row to either curved or two-tier construction. Even much of the present interlocking may be shed, and its protective function transferred to the trains themselves—who can say? What we all must admit however is that much of the work of these early pioneers was so good that it has successfully met the ever increasing demands of increased traffics, greater range of operation, and heavier load, while some of the recent developments have actually confirmed the objects and ideals at which they aimed.

Degreasing Equipment

A wide range of trichlorethylene degreasing equipment is now being supplied by I.C.I. (General Chemicals) Limited. Among the new models is a plant for degreasing the interior of compressed gas cylinders in which the trichlorethylene vapour is generated in a suitably heated still and provision is made for the subsequent collection of the mixed oil and solvent for further use. Another improvement is the flame-proof equipment which meets the stringent requirements of the L.C.C. As the combustion chamber is completely isolated, the plant may be used in an atmosphere containing inflammable vapour. All the 1934 models include improvements directed towards economy and simplicity of operation. Crude oil and paraffin heating is allowed for, and new designs of thermostats prevent the solvent becoming saturated with oil by limiting the maximum temperature of the Tri-oil solution to 120° C. Heat radiation losses and wasteful dispersion of the solvent vapour by convection currents have been reduced to a minimum. The standard "D" type in its latest form is a general-purpose plant suitable for all degreasing requirements within the limits of its size, and an electrically-heated "Popular" type is now available.

RAILWAYS AND ROAD TRANSPORT SECTION

This section appears at four-weekly intervals

Road Signalling

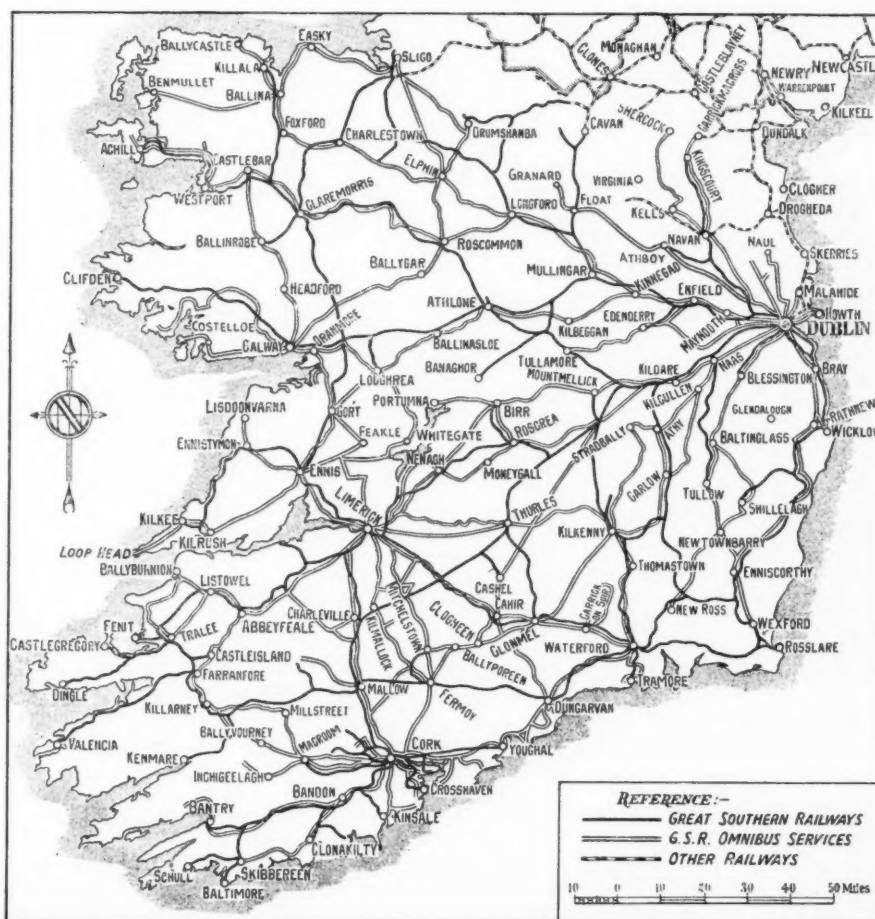
THE growing importance of the use of permanent signs and mechanical signals in controlling road traffic is indicated by the publication, almost simultaneously, of new Provisional Rules and Orders on Traffic Signs, made by the Minister of Transport under the Road Traffic Act, 1930, and a report of the Permanent Committee on Road Traffic of the League of Nations. The latter gives extracts from the 1931 Convention on the unification of road signals, together with subsequent recommendations of the Permanent Committee on such matters as rendering day signs visible at night, light signals, signals to be made by police and drivers, and the height of signals. In view of the success of the three-light system in Great Britain, Germany and Italy, it is rather surprising to find the Committee recommending the use of the red light alone, on the score of simplicity.

The new British regulations amplify the 1932 regulations, which they replace, and embody the recommendations of the Departmental Committee on the subject, while in one or two instances changes have been made to bring them into line with the International Convention. One way in which the British signs differ from the International scheme is in the use of a definite warning of the approach to a main road, instead of the inverted red triangle, which is apt to be unrecognised. There are also a number of new informative signs defined in the British regulations including, Road Narrows; Narrow Bridge; Low Bridge; Low Bridge—Try Load Gauge; Roundabout; and Major Road Ahead, the sign to which we have just referred and which is mounted on a post surmounted by a red triangle in a circle. All the signs, including those indicating road numbers and junctions, and those placed on the road surface, have to be of specified dimensions, although existing signs, provided they do not conflict otherwise with the regulations, may be continued in

use until they have to be replaced, but the Minister of Transport is urging local authorities to bring signs in their areas up to date as soon as possible.

Bus Services in the I.F.S.

FOLLOWING up the announcement in our issue of January 19 regarding the formal taking over of the Irish Omnibus Company's undertaking by the Great Southern Railways, we have prepared from the details given in the first official timetable issued under the new auspices a map showing the routes of the various services. This brings out the remarkable manner in which the services form a network covering the country and linking-up towns and villages with the railway. From the timetable it would appear that there are well over one hundred regular services in operation and the index of places



Sketch map showing the bus routes of the Great Southern Railways

served contains more than 500 names, which again serves to indicate the comprehensive nature of the services, although the number probably could be more than doubled by the inclusion of all the halts at which passengers are taken up and set down. The services vary in intensity, of course. Between Cork and Skibbereen, for example, one service each way is sufficient on weekdays, although two are run on Sundays. On other routes buses run only on certain days, like the Sunday services between Limerick and Killonan and the Saturday runs between Limerick and Bruree. The number of services will be considerably added to during the summer months. There is active co-ordination between the G.S.R. and the Great Northern Railway (Ireland) between Dublin, Navan, and Kells, each company running alternate buses, while in the Sligo-Donegal area the G.N.R.(I) runs the services. It is clear that an endeavour has been made to connect up services wherever possible, and in quite a number of instances mention is made of the fact that buses arrive in time to link up with the train services. Doubtless now that the undertaking is under railway control there will be further co-ordination on these lines, and make even more real than it is at present the claim of the company that the bus services "link up the entire Free State."

Co-Ordination

IN all parts of the world the struggle to secure an effective measure of co-ordination between railway and road transport continues to find expression in new

laws. The Swiss Federal Council has framed a measure which it is hoped will be approved by the States Council at its forthcoming meeting so that it can go into effect at the beginning of next year. Briefly, it aims at requiring all who carry goods or animals as a business beyond a distance of ten kilometres to have a licence. There will be two types of licence, the Normal licence for the carriage of goods in a certain district or over specified routes and the Special licence for removal contractors and the transport of goods for which the motor vehicle may be technically advantageous.

New Zealand has also a new law, which came into operation on the first of this month and which sets up a Transport Co-Ordination Board to fulfil the dual purpose of an advisory body to the Government on transport problems and to be a court of appeal on transport licensing matters, thereby replacing the Appeal Board set up under the Transport Licensing Act of 1931. From time to time, of its own initiative, or when directed by the Minister, this new Board is to make inquiries or investigations as are considered expedient and to report the result to the Governor-General through the Minister with recommendations for the improvement, co-ordination, development and better control of all facilities for transport. It is also required to make an annual report to Parliament and will hear and determine appeals from the district transport licensing authorities. The new Board has been given all the powers of a Commission, and it is hoped that it will hold the balance fairly between the necessary road services, railways and sea transport.

The Transport Advisory Council

The Minister of Transport, having completed his consultations in connection with the appointment of members of the Transport Advisory Council to be established under the Road and Rail Traffic Act, 1933, has appointed the following to be members of the Council for a period of three years. The Minister does not propose at present to exercise his powers to appoint two additional members.

Chairman :—

The Rt. Hon. Viscount Goschen, P.C., G.C.S.I., G.C.I.E., C.B.E., Joint Parliamentary Secretary to the Board of Agriculture in 1918; Governor of Madras from 1924-29, and Viceroy and Acting Governor-General of India from June to November, 1929.

Representatives of the interests of railways :—

Sir Josiah C. Stamp, G.B.E., D.Sc., LL.D., F.B.A., Chairman and President of the Executive Committee, L.M.S. Railway; Sir James Milne, C.S.I., General Manager, G.W.R., and Sir Herbert Walker, K.C.B., General Manager, Southern Railway.

Representatives of the interests of local authorities in England and Wales :—

Sir Frederick Berryman, D.L., J.P., Chairman of the Highways Committee, County Councils' Association; Alderman Sir Percival Bower, M.B.E., J.P., former Lord Mayor of Birmingham; Lieut.-Colonel Sir Seymour Williams, K.B.E., Chairman of Executive, Rural District Councils' Association; and Councillor Basil Marsden-Smedley, London and Home Counties Traffic Advisory Committee.

Representatives of the interests of local authorities in Scotland :—

Major Sir Robert Brooke, Bt., D.S.O., M.C., D.L., Convener of Ross-shire County Council; and Bailie Alexander McLean, Convener, Glasgow Corporation Transport Committee.

Representatives of the interests of users of mechanically-propelled vehicles :—

Sir James Adam, K.C., C.B.E., Vice-President, Royal Scottish Automobile Club; Mr. Sidney E. Garcke, M.I.Mech.E., M.Inst.T., Vice-Chairman, Omnibus Owners' Association; Mr. William Edwards, M.Inst.T., President, National Road Transport Employers' Federation; Mr. John Storer Nicholl, M.Inst.T., Senior Vice-Chairman, Road Haulage Association; and Mr. S. N. Horne, M.Inst.T., President, Commercial Motor Users' Association.

Representative of the interests of users of horses and horse-drawn vehicles :—

Mr. Cecil G. Argles, J.P., Past-President, National Horse Association of Great Britain.

Representatives of the interests of labour :—

Mr. Ernest Bevin, General Secretary, Transport and General Workers' Union; Mr. John Marchbank, Secretary, National Union of Railwaymen; Mr. W. R. Spence, General Secretary, National Union of Seamen.

Representatives of trading interests (including agriculture) :—

Sir A. Steven Bilsland, Bt., M.C., J.P., President, Glasgow Chamber of

Commerce; Mr. E. J. Fox, Managing Director, Stanton Ironworks Co. Ltd.; Mr. W. H. Gaunt, C.B.E., M.Inst.T., President, Mansion House Association on Transport; Mr. J. W. Sutton, Chairman, Transport Committee, Co-operative Wholesale Society Limited; Mr. Rowland R. Robbins, C.B.E., J.P., late Chairman National Farmers' Union.

Representative of the interests of canals (other than canals owned or controlled by a railway company) :—

Mr. Wilfred H. Curtis, Chairman, Grand Union Canal Company.

Representatives of the interests of coastwise shipping :—

Sir Alfred Read, J.P., Chairman, Coast Lines Limited; and Captain J. Fisher, Vice-Chairman, Coasting Tramp Committee of the Chamber of Shipping.

Representative of the interests of harbours and docks (other than harbours and docks owned or controlled by a railway company) :—

Mr. L. A. P. Warner, C.B.E., General Manager, Mersey Docks and Harbour Board.

Representative of the interests of pedestrians :—

Sir Alexander Kaye Butterworth, LL.B., Vice-President, Pedestrians' Association.

Representative of the interests of pedal cyclists :—

Mr. W. P. Cook, Vice-President, Cyclists' Touring Club.

To be Secretary :—

Mr. R. H. Tolerton, D.S.O., M.C., Ministry of Transport, 7, Whitehall Gardens, S.W.1.

A New Type of Two-tonner

A description of the Commer Pug chassis which has been specially developed to meet the requirements of local collection and delivery work and is characterised by large body space and a remarkably small turning circle

IT is almost unnecessary to emphasise the need for as much room as possible for the load-carrying space of vehicles intended for the collection and delivery of small merchandise and parcels, especially where a great deal of the traffic may consist of bulky items of light weight. At the same time there is the need for easy handling of the vehicle in congested goods yards and narrow streets. The introduction of the forward control type enabled a valuable increase in the load space to be secured, but the question of the manoeuvrability of the vehicle proved not quite so easy of solution. At the last Commercial Motor Transport Exhibition at Olympia, however, there was one vehicle which attracted a great deal of attention on both these counts, and it is interesting to learn that its designers have been working in collaboration with a firm whose main business is the transport of small merchandise and parcels.

The vehicle in question is the Pug 2-ton local delivery van produced by Commer Cars Limited, which has supplied a number of them to Carter Paterson & Co. Ltd., and has further orders in hand, as recorded in these pages recently, to bring the total in this service up to 55. The fact that this concern has passed into the control of the railway companies would make this new vehicle of special interest, therefore, even though it did not embody the unorthodox features which do, in fact, distinguish it.

It has real forward control, as the driver is placed right in front and the use of a vertical steering wheel has enabled the space required in a fore and aft direction for the driver's compartment to be reduced to the minimum without in any way interfering with the driver's comfort or convenience. There is really nothing new in arranging the steering wheel in this way, and experience has shown that it imposes no difficulty upon the driver and, in fact, his position enables him to manoeuvre the vehicle in

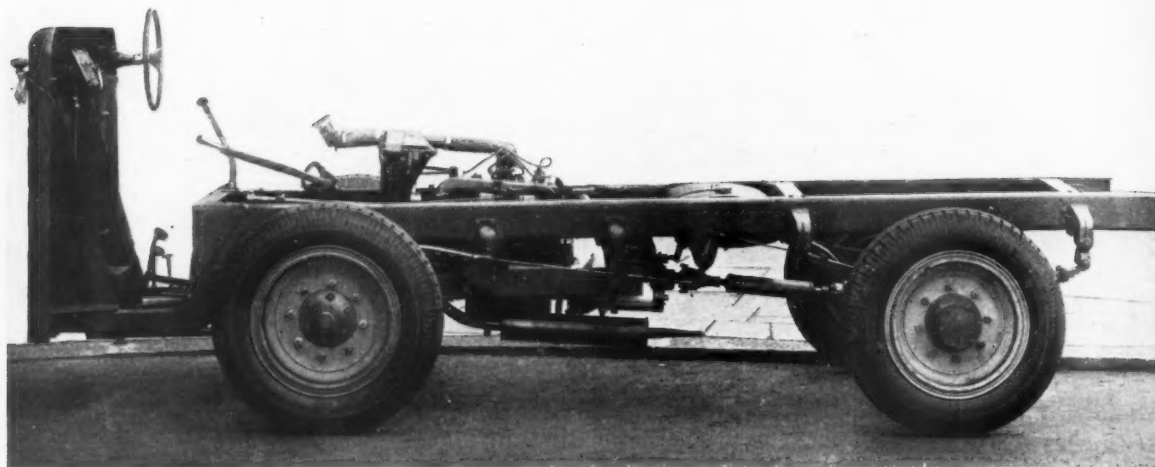
confined areas with remarkable precision. Since the vehicle was first introduced the steering gear has been improved and, as one of our illustrations brings out, it is now possible for the Pug to turn, still with room to spare, in a street 30 ft. wide. There is another point about this position and that is that it enables the seat to be placed low down so that the driver—or his mate—can walk straight in and out of his compartment on either side, without any climbing and no dodging of the steering column.

It might be thought that these changes from what might be termed the orthodox arrangement of a chassis might lead to inaccessibility of the mechanical parts, but a study of the photographs reproduced will show that there is no difficulty on that score. The engine is slung in the chassis immediately behind the front axle, and the details are just as get-at-able there as they would be under an ordinary bonnet. This is, of course, most important from the maintenance point of view, and it may also be pointed out that the engine, clutch, and gearbox form one unit, on a three-point rubber mounting, which enables it to be easily detached with the radiator and all accessories, when required.

The engine is of compact and sturdy design, having four cylinders with valves at the side. With a bore of 69.5 mm. and stroke of 110 mm. it has a capacity of 1,669 c.c. and a rating of 11.9 h.p. The pistons are of the Invar Strut pattern. A duplex roller chain drives the camshaft; the oil pump and distributor are operated by a vertical shaft worked off the camshaft, while the dynamo and fan are driven by a belt from the crankshaft. Petrol is fed to the Solex carburettor by an A.C. pump from the tank, which is slung almost amidships in the chassis. Ignition is by coil and distributor. The oil is forced to the crankshaft and gudgeon pins, with splash lubrication



A Commer Pug turning a sharp corner



Side view of the Commer Pug 2-ton chassis

to the camshaft. The lubrication of the chassis is effected by means of a grease gun.

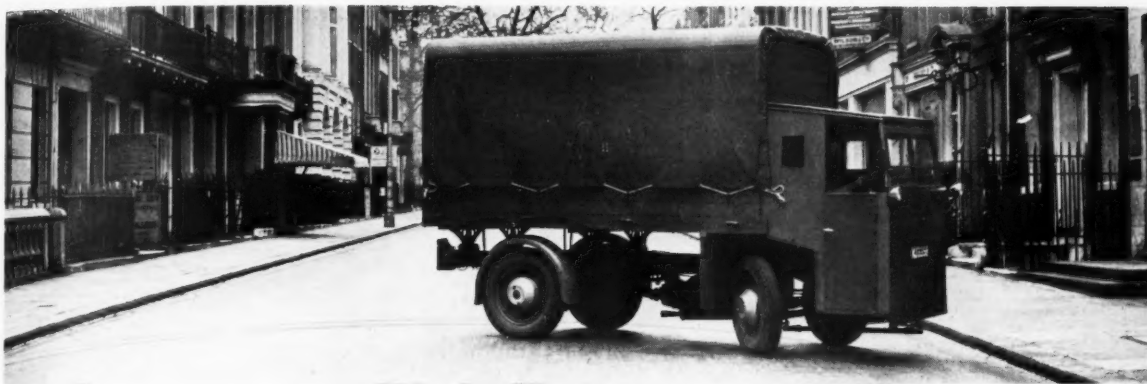
The single dry-plate clutch is entirely enclosed in the steel flywheel, and while it requires no attention in the way of lubrication there is an accessible external adjustment to deal with wear. The gearbox, designed for heavy duty, provides four forward speeds, and the operating lever is mounted on the front member of the chassis frame, where it is convenient to the driver. At the front of the engine there is a radiator of the film type with a capacity of five gallons; the water is circulated by a centrifugal pump, while the cooling is assisted by a large fan. A tubular propeller shaft with mechanical universal joints takes the drive to the spiral bevel gear, made of oil-

hardened high tensile steel, in the pressed steel banjo casing of the fully floating rear axle. The steering gear is of the Bishop cam and roller type, which is light and positive in action. The brakes are of the Bendix self energising duo-servo type, those on the front wheels working in 12 in. diameter drums, while on the rear wheels there are 14 in. drums, with independent hand screw adjustment to each wheel. The suspension is by semi-elliptic springs at front and rear.

With a wheelbase of 8 ft., there is a distance of just over 11 ft. from the back of the driver's cab to the end of the frame, while the overall length is 14 ft. 7 in.; there is a variation in the track, that of the front wheels being 5 ft. 3 $\frac{3}{4}$ in., while the back ones are 5 ft. 1 $\frac{1}{4}$ in. apart.



A view from above the Commer Pug chassis showing the general arrangement of the mechanism



The Commer Pug van turning in a 30-ft. street with room to spare

The chassis weight, excluding fuel, oil, water and spare wheel, is quoted as approximately 1 ton 8½ cwt. (1,448 kilogs.), while the maximum gross load with body and cab is given as 2 tons 12 cwt. (2,642 kilogs.). The tax is £25.

There is a useful equipment, including electric lighting set, with dynamo and six volt, 63 amp. battery, the head-lamps being fitted with a dip and switch arrangement.

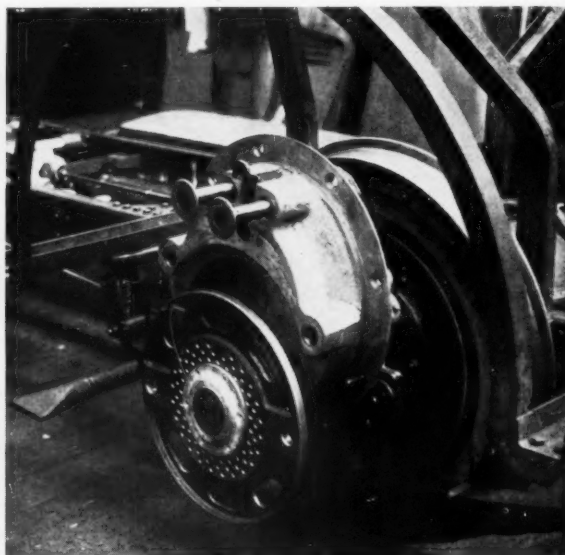
The instrument board carries petrol and oil-pressure gauges, ammeter, speedometer and lighting switch, and they can be illuminated at night. An electric horn, wheel jack and brace, grease gun, hand tyre pump, spare wheel and tyre and a kit of tools are included, and a power-driven tyre pump is available at an extra charge. The wheels are of the detachable steel disc type, and are fitted with 32 in. by 6 in. reinforced heavy service tyres.

The Karrier Road-Rail Vehicle

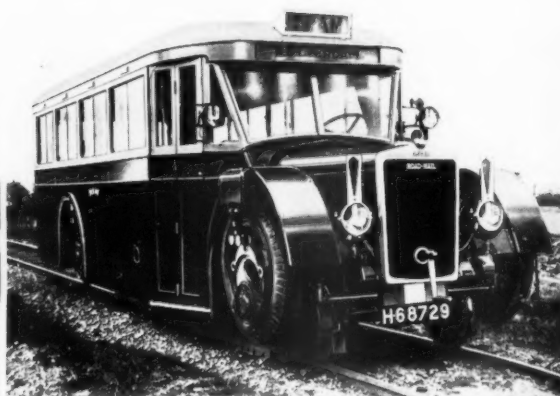
To the details of the Karrier Road-Rail vehicle to be used for permanent way maintenance work on the West Highland section of the L.N.E.R., mentioned in our issue of January 19, it may be added that the device used for changing over from road to rail wheels will be that known as the Karrier C slot type illustrated below. When on the road, the road wheel is held concentrically with the axle by the two driving pins, one each side of the hub. To lift the road wheel the vehicle is driven on to the rails and the wheel turned until a trigger is in the bottom position; the driving pins are then withdrawn and the wheel

swung upwards, when it is held by the pins being placed, through a hanging bracket, into the two holes side by side, as shown in our second illustration.

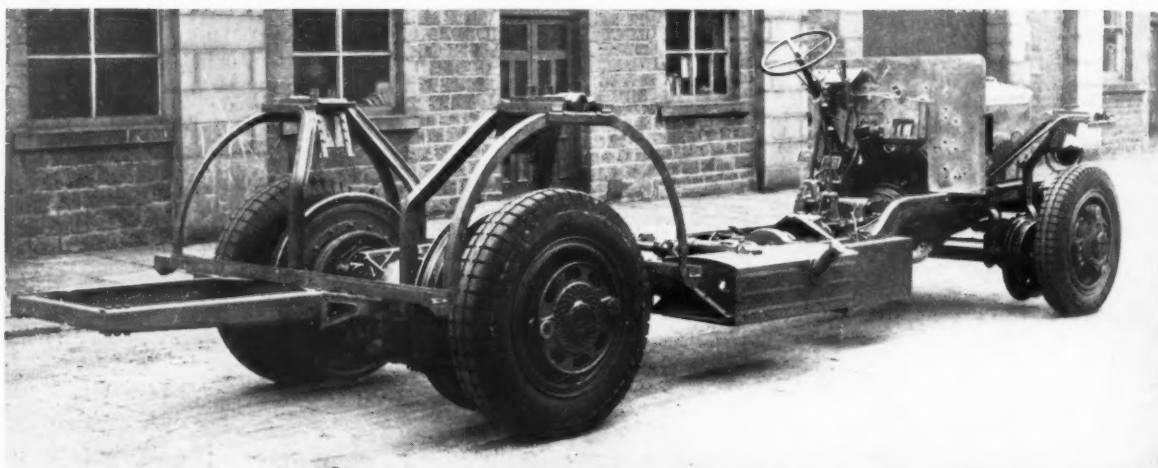
The L.N.E.R. vehicle is fitted with a 31-48 h.p. four cylinder engine with a cone clutch and four speed gearbox, the drive being taken to the back axle by a propeller shaft with mechanical type joints at either end. The road wheel track is 6 ft. 4⅜ in. and the wheelbase 10 ft. 10 in., while the speed on the rail is given at 37 m.p.h. The Road-Rail vehicle working in Holland is illustrated on the next page.



Left, the Karrier wheel in position for going on the road. Right, the road wheel removed but with its centre part in the raised position to show the C slot

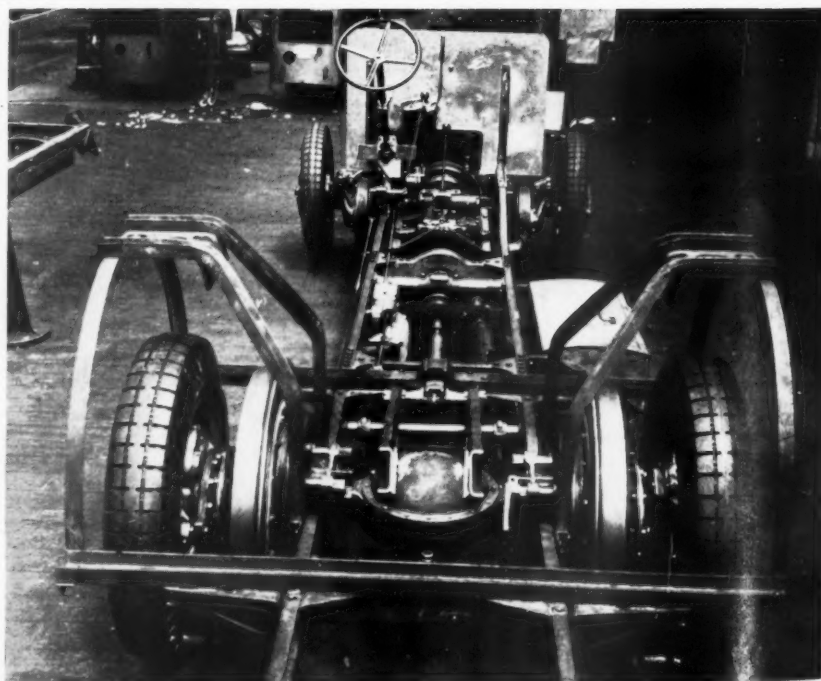


Karrier Road-Rail vehicle on the road and on the rail in Holland



A Karrier Road-Rail vehicle in Holland. These two photographs of the chassis of the Karrier coach, which is regularly operated by the Rotterdam Tramway Company over the rail between Rotterdam and Ostvoorne, and thence to Rockanje on the road, enable the general arrangement of the mechanism to be seen. It should be noted that the rail wheels are of 3 ft. 6 in. gauge, which simplifies to some extent the arrangement of the wheel-changing gear. The coach has a four-cylinder engine of 65 h.p. and carries 26 passengers; the entrance is at the front of the vehicle

(See article on previous page)



AUTOMATIC TRAIN CONTROL IN SWITZERLAND

The Signum magnetic induction train control has now been adopted as standard for the Swiss Federal Railways. The device automatically comes into operation in case of failure of current

FOR several years past the Swiss Federal Railways have been studying the advantages offered by the inductive, as opposed to the mechanical or electric system of cab signalling apparatus, and numerous trials have taken place recently for the purpose of coming to a definite decision and comparing the cost of the various equipments.

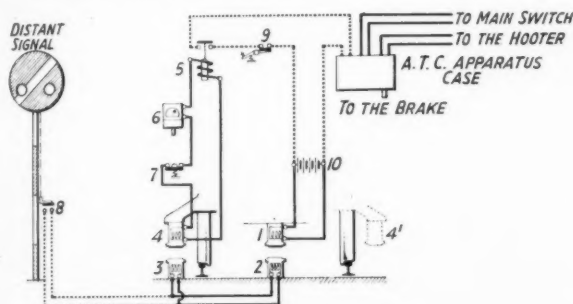


Fig. 1—Diagram of Signum A.T.C. system

Moreover, visits have been paid to other countries in order to inspect the working of the apparatus in use and to ascertain the results achieved. The Swiss Federal Railways' authorities have now come to the conclusion that the inductive system of apparatus manufactured by the Swiss firm of Signum S.A., of Wallisellen, in collaboration with the technical experts attached to the Federal Railways, is the one that presents the greatest advantages and is best suited to their requirements. Some twelve months ago a number of Signum equipments were installed at signals at intermediate stations on the Berne-Thun line, and the corresponding apparatus was attached to certain locomotives operating on this line. Extensive trials were then made which have proved entirely satisfactory.

Decision to Standardise Signum Train Control

At a meeting of the Administrative Board of the Federal Railways, which took place on December 1, 1933, it was unanimously decided to introduce the Signum automatic train control at distant signals on all the electrified lines of the system—a few unimportant branch lines excepted—and on all the electric railcars and locomotives. The necessary credit has been voted, and the work of equipment will occupy a period of 3 or 4 years.

In accordance with the conditions laid down by the Federal Department of Railways, the train control apparatus must, when placed at a prescribed distance from the signal at "stop," produce a rapid braking effect, at the same time sounding an alarm whistle. Should the driver observe the "stop" signal in time, either directly or by seeing the relative distant signal, he will be able, by pressing a "vigilance button," to arrest the action of the automatic braking apparatus and stop his train by ordinary means. In this way all unnecessary braking and whistling are eliminated, while the driver is given the opportunity of proving that he saw the stop signal in time and acted in obedience to it. Should the driver, on the other hand, neglect to press the vigilance button, the paper band on the Hasler locomotive speed recording

indicator—with which all Swiss Federal electric locomotives and railcars are fitted—will register the omission, being automatically perforated when passing through the apparatus. In this way the driver will not be tempted to rely solely on the automatic safety device or be careless in his look-out. Almost immediately after passing over the track equipment, a hooter sounds in the driver's cabin, warning him of the coming into action of the automatic braking device, in order that he may, by pressing the button, prevent rapid braking and the sounding of the alarm whistle, and bring his train to a standstill by ordinary means. Should the driver for any reason, such as sudden illness, be unable to press the button, the automatic stopping device will function soon after the sounding of the hooter and the train will be brought to a standstill by means of a rapid application of the brakes.

The apparatus does not function when the signal is at "clear." In view of the fact that normally signals are at "clear" when a train is running to schedule time, the driver does not have to trouble about the automatic control except in special cases. In this way the pressing of the button will not become a mere habit. As it is essential that the driver should be able at all times and in all weathers to recognise the point on the line where the track equipment is placed—so that he may know when the button should be pressed if the signal be at "stop"—the apparatus is placed opposite the distant signal which it situated so far in front of the stop signal that the train will be brought to a stand automatically by a full brake application there.

The Swiss electric locomotives and railcars are already



Fig. 2—Track magnets at distant signal, showing contact separated by disc

(The disc is green with white stripe; in the "caution" position it shows two green lights, at "clear" two white ones)



Fig. 3—Locomotive approaching track magnets

equipped with a dead man's pedal and this is now being combined with the new train control device. Just as when the dead man's pedal is released, the electric circuit is interrupted, so is the said circuit opened by means of an interrupter worked by the automatic train control device in order to cut off the main current and apply the brakes.

The System Described

The Signum system is a combination of both magnetic and electric action and works as follows:—Four electro-magnets are used to actuate the relay for interrupting the current of the dead man device. The first electro-magnet 1 is suspended from the locomotive between the wheels. This is the exciting magnet, which is permanently magnetised by the continuous current of the accumulator battery 10 of the lighting set of the locomotive. A second electro-magnet 2 is fixed in the centre of the track. Its iron core is successively magnetised and de-magnetised when the exciting magnet 1 of the locomotive passes over it. An impulse is thus produced in its winding. This impulse passes into the winding of a third electro-magnet 3 fixed to the sleepers on the outside and to the left of the track (to the left in the sense of the direction in which the train is travelling) and magnetises its core. A fourth electro-magnet 4, the receiving magnet, is fixed to the left side of the locomotive at the same distance from the centre of the track as magnet 3. Its core is magnetised and de-magnetised when it passes over magnet 3 placed on the track. A new impulse of current is then produced which operates the relay 5 interpolated in the circuit of the dead-man device. This circuit, being interrupted, brings the apparatus into action. At the same time the impulse of the current of magnet 4 drives a perforator into the speed recorder strip.

The vigilance button 7 makes it possible for the driver to interrupt the connection between the receiving magnet 4 and the train control relay 5, and in this way prevents the functioning of this relay and the perforation of the recorder strip. In order that the automatic working should not function when the signal shows "clear," the winding of the magnet placed between the rails is short-circuited by a contact maker 8 placed on the distant signal, so that current does not reach the winding of magnet 3 placed on the left of the track when the signal is "off." The latter does not become magnetised and therefore does not affect magnet 4 on the locomotive. The contact maker 8 on the distant signal is closed when the signal is off.

Automatic Safety Action in Case of Current Failure

Should the electric wire connecting the contact maker on the distant signal break, or should the contact maker fail to function properly, the device acts as if the signal were "on." The same principle is applied to the equipment of the locomotive, so that the automatic train control comes into action should there be a broken wire or other defect in the circuit. This also applies to the dead-man device, which functions automatically as soon as the circuit is interrupted, whether this be a result of the driver releasing the pedal, the functioning of the A.T.C. device, or the breaking of a wire, or the failure of the battery. Fig. 2 shows the two track magnets near the distant signal; Figs. 3 and 4 show the magnets on the locomotive and on the track at the moment of the passage of an engine. The distance between the magnet on the locomotive and that on the track is 80 mm. ($3\frac{1}{8}$ in.) when the engine is stationary, the minimum gauge clearance.

(See editorial article on page 251)

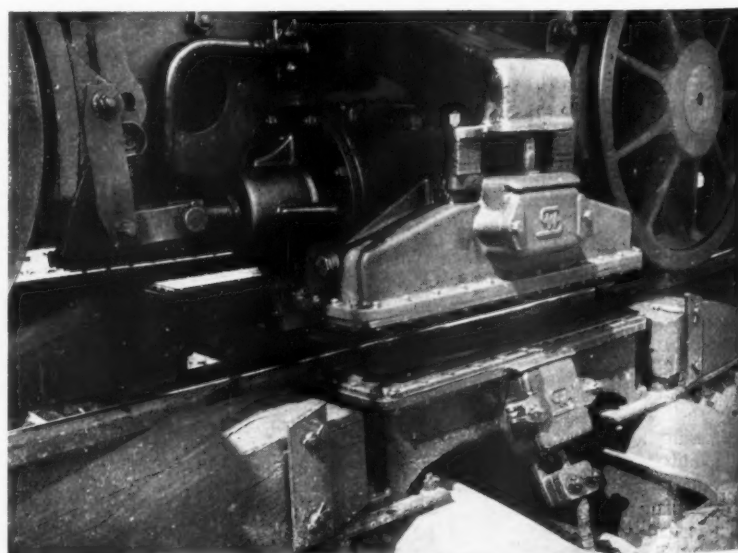


Fig. 4—Locomotive magnet passing over a track magnet

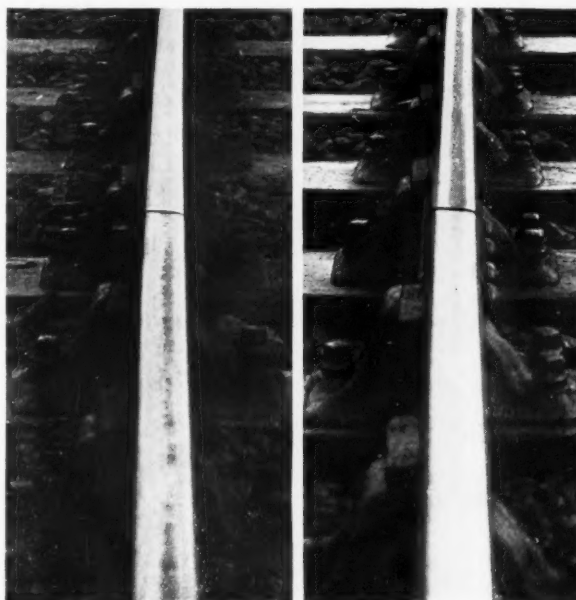
REGULATED SORBITIC TREATMENT OF RAILS

THE Southern Railway has recently been experimenting with an improved Sandberg Sorbitic rail, and, of the accompanying illustrations, the first shows (above) an ordinary rail, and adjoining it (below) a similar rail sorbitically treated by the Sandberg process as hitherto operated. The second photograph shows also an ordinary rail, and next to it (above) one treated by a new Sandberg Regulated Sorbitic treatment. All these rails, which are of 95 lb. per yd. B.S. section and medium manganese composition, were laid in the track near Peckham Rye ten weeks before the photographs were taken, and during that period had carried about 200 trains a day; nearly all multiple-unit electric trains. The Regulated Sorbitic rail, it will be observed, has resisted wear better than the others and, in fact, after the passage of something like 14,000 trains (for the Sunday service is almost as intensive as the weekday service) only the edges have had the skin worn off. The ordinary sorbitic rail shown in the first photograph also has worn better than the untreated medium manganese rail, but not so well as the Regulated Sorbitic rail. All these rails after rolling were put through the Sandberg retarded cooling ("Oven") process, in accordance with the practice now usual in this country.

The Regulated Sorbitic treatment process is an improvement upon the old method of sorbitising rails, in that the action of the cooling medium is regulated in such a manner as to produce a far more effective result than was formerly attainable. A superior micro-structure, consisting of pure sorbite, free from pearlite, is attained by it in the part of the rail-head which is subjected to wear, and this is accompanied by a higher yield point than was previously obtained, together with a higher elongation and reduction of area, and greater hardness under impression tests made upon the rail tread and for some distance beneath it. A high degree of toughness is a marked feature of this hard quality rail. This new Regulated Sorbitic process has

been developed at the Workington plant of the United Steel Companies Limited.

We are indebted to Mr. George Ellson, Chief Engineer of the Southern Railway, for these interesting particulars. We understand that the indications of a further improvement in the new quality has led to the ordering of a considerable tonnage of the new process rails.



The left-hand view shows, above, an ordinary rail and, below, an ordinary Sorbitic rail; the right-hand view, above, a Regulated Sorbitic rail, and, below, an ordinary rail



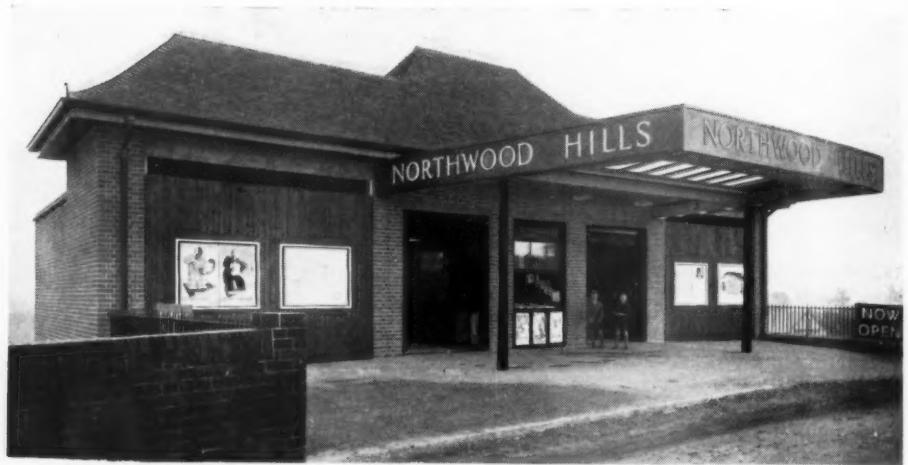
DICTAPHONES ON L.N.E.R. EXPRESSES

(See article on page 278)

Interior of saloon compartment being used as a business office. Special compartments are provided on certain L.N.E.R. London and Newcastle express trains for the purpose of dictating and transcribing correspondence en route. The portable Dictaphones will be noticed in use

Rus et Urbs

(See editorial note on page 248)



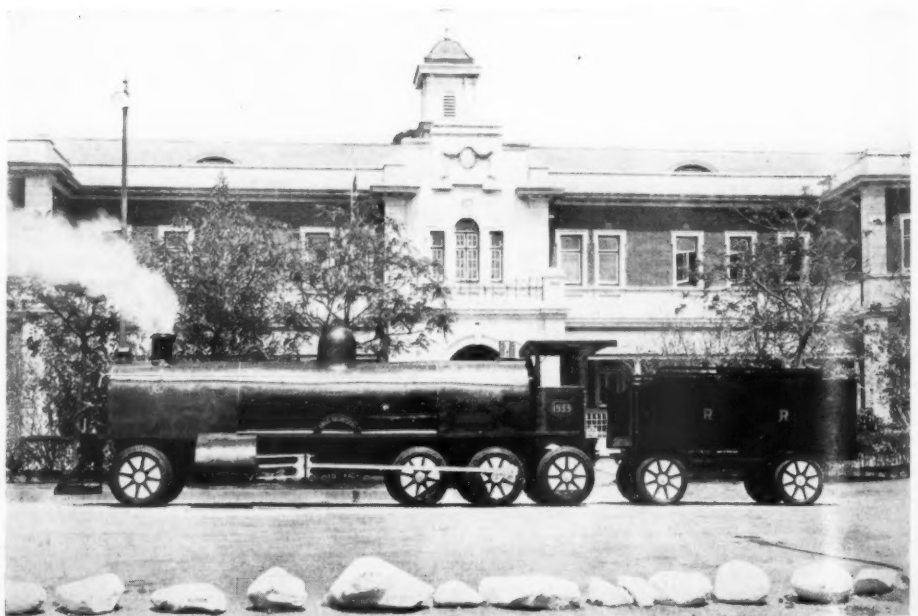
The recently opened Northwood Hills station, above, conforms with Metropolitan Railway tradition to harmonise with rural surroundings



Cockfosters station, shown on the left, is the terminus of the last line built by the Underground group before its absorption by the London Passenger Transport Board. An urban efficiency is the characteristic

Railway Exhibit at Bulawayo Anniversary Pageant

The model locomotive in the 40th Anniversary Celebrations Pageant at Bulawayo, seen in the accompanying illustration, was built in the workshops of the Road Motor Services, Beira and Mashonaland & Rhodesia Railways. The basis was a 5-ton Thornycroft X.B. type chassis, from which the normal body and cab had been removed. A skeleton frame conforming to the general outlines of a 12th class locomotive was built up from strip iron and on this were nailed light iron plates. An old dome was cut down to suit. The cab was built up on a wooden frame covered with mill-board. A pair of wheels fitted to a trailer axle was slung in the rear of the normal rear bogie. The cylinders, slung on the chassis, were of sheet iron and to them were attached slide bars of wood which carried the cross heads, these being in turn attached to the connecting rods driven by cranks on the centre pair of rear wheels



RAILWAY NEWS SECTION

PERSONAL

The Minister of Transport, in accordance with the provisions of the Road and Rail Traffic Act, 1933, has now appointed the various members of the Transport Advisory Council. These are detailed on page 264 of this issue.

We regret to record the death on February 14, of Sir Vincent Raven, K.B.E., Chief Mechanical Engineer, North Eastern Railway, 1910-1923, and Chief Technical Adviser to the L.N.E.R., 1923-24. A brief outline of his career will be found upon page 260 of this issue.

We regret to record the death, on February 6, of Mr. M. W. Clements, who was the driver of the Great Western Railway locomotive *City of Truro*, when it attained the speed of 102.3 m.p.h. on the Wellington bank in 1904.

Mr. E. R. Bullough is retiring from the Secretary's organisation of the L.M.S. Railway at the end of February. He joined the Midland Railway in 1888, serving in the Goods Department for ten years before being promoted to the General Manager's personal staff. There he worked under Mr. Frank Tatlow for nearly 25 years, acting as Secretary of the Steamship Committee of Directors for part of that time. On the amalgamation, Mr. Bullough was attached to the Marine Department at Derby, subsequently being transferred to the personal staff of the General Manager at Euston. In 1929 he was given charge, *inter alia*, of the newly-inaugurated Central Records Office under the Secretary.

L.M.S.R. APPOINTMENTS

In addition to those recorded on page 219 of our last issue, the following appointments have been approved by the Directors:—

Chief Commercial and Chief Operating Managers' Departments

Mr. A. Rowland, Goods Agent, Alexandra Dock, to be Goods Agent, Birkenhead.

Mr. R. J. Baptist, Goods Agent, Sandon Docks and North Docks, to be Goods Agent, Alexandra Dock.

Mr. T. Elsworthy, Goods Agent, Langton Dock and North Mersey, to be Goods Agent, Sandon Docks and North Docks.

Mr. E. Hopkins, Chief Clerk, Alexandra Dock, to be Goods Agent, Langton Dock and North Mersey.

Scottish Changes

Mr. J. Ferguson, Inspector, Operating Manager's Office, Glasgow, to be Goods Agent, Glasgow (College).

Mr. R. S. Griffiths, who, as foreshadowed in THE RAILWAY GAZETTE of December 8, has been elected President of the Institution of Railway Signal Engineers for the current year, joined McKenzie & Holland Limited in 1892 and, after varied experience, was placed in charge of all erection work in the Southern Area. This included extensive contracts on the G.N., G.E. (Liverpool Street and Bishopsgate), L.B.S.C. (Victoria), L.S.W. and S.E. Railways. Upon the formation of the



Mr. R. S. Griffiths,

Elected President, Institution of Railway Signal Engineers

McKenzie Holland & Westinghouse Power Signal Co. Ltd., he supervised the installation of the Praed Street-Aldgate, Baker Street - Neasden, and Central London contracts, and under the Westinghouse Brake & Saxby Signal Co. Ltd. he has subsequently been concerned with mechanical signalling in all parts of the world and was largely responsible for the development of the double wire system. Mr. Griffiths has been a Member of the Institution of Signal Engineers since its foundation in 1913 and a Member of Council since 1927. Papers he has read before the Institution include "Some Impressions on Continental Signalling Practice" (1917), "The Double Wire System of Mechanical Signalling" (1925)—awarded first prize for papers during that year—and jointly with Mr. T. S. Lascelles, "The Problem of Signal Aspects, what must we tell the man on the footplate?" (1930). He has served on many committees and continuously on the Summer Convention and Dinner Committee, having

acted as M.C. at all dinner dances since they began in 1927. Mr. Griffiths was elected A.M.I.M.E. in 1904, Fellow of the Permanent Way Institution in 1923 and M.Inst.T. in 1931.

Mr. J. M. Ainsworth has been appointed Secretary of the Vacuum Oil Co. Ltd.

Captain T. E. Crease, R.N., has been elected a Director of Davy Bros., Engineers, Sheffield.

Mr. G. J. Churchward, sometime Chief Mechanical Engineer, Great Western Railway, left estate valued at £61,689 (£61,430 net).

From the *London Gazette*:—Engineer and Railway Staff Corps.—Mr. R. A. Thom, M.Inst.M.E., to be Major (February 7). Major Thom is Mechanical Engineer, Southern Area, L.N.E.R.

We regret to record the death on February 9, of Mr. Ralph Pass, Chief Clerk to the Superintendent, Western Section, Southern Area, Liverpool Street station, L.N.E.R., and formerly Chief Clerk to the Superintendent of the Great Central Railway, after over 50 years' railway service.

Mr. A. O. Whitehouse, B.Sc., London, A.M.I.C.E., has been appointed Deputy Engineer-in-Chief of the Nanking-Shanghai and Shanghai-Hangchow-Ningpo Railways, and arrived in Shanghai on January 10 to take up his new duties. Mr. Whitehouse has seen considerable overseas railway service, having previously been on the Nigerian Railways and the Buenos Ayres Western Railway.

Herr Baumgarten has been appointed Director of the Berlin Civil Engineering and Transport Museum, in succession to Herr Hoogen. He studied civil engineering at the Technische Hochschule, Aachen, from 1893 to 1897, and then took the State examinations for Regierungsbauführer and Regierungsbaumeister (assistant engineer and civil engineer). Since 1897 he has been in the service, first of the Prussian State Railway Administration, and later of the German State Railway, mainly in the Operating Department as Manager and as Member of several Divisional Boards. From 1925 to 1933 Herr Baumgarten was in charge of the passenger time tables of the German State Railway, and on November 1, 1933, he was nominated Director of the Verkehrs und Baumuseum (Civil Engineering and Transport Museum), Berlin.

"Euston House," L.M.S.R.

New headquarters of the Commercial, Operating, Signal and Telegraph, and Stores-Purchase Departments

Euston House, which has been designed as the new central headquarters of the Commercial, Operating, Signal and Telegraph, and Stores-Purchase Departments of the London Midland & Scottish Railway, represents an important contribution towards the task which the company, the largest of the four groups, had to tackle on the amalgamation of 1923, namely, the fusing into a homogeneous concern no fewer than 35 separate companies, each previously controlled from a different centre with differing methods and practices. For ten years the work has

gone on with a view to securing standard practices, eliminating wasteful duplication and increasing efficiency and economy.

However, large sections of the staff were still housed at Derby and in separate buildings in London, and it became evident that if the complete and successful concentration of the executive officers of the new company was to be effected at Euston, additional office accommodation was necessary, and the adjacent Seymour Street site, with a superficial area of 200,000 sq. ft., was selected as the most suitable

and convenient. In planning the new offices the primary consideration was to bring together the headquarters staff of the Commercial, Operating, and Stores-Purchase Departments, with which the public has the greatest contact. Simultaneously, the release of existing accommodation occupied by these departments in the old Euston building has permitted the concentration there of the headquarters of the Secretarial, Engineering, Finance, and Estate Departments.

The building of Euston House was authorised at a time of great trade depression, and its erection provided direct employment for an average number of 345 British workmen, extending over a period of 11 months, and, in addition, indirect employment for large numbers of others in the manufacture of British materials and equipment.



General view of Euston House, the new L.M.S.R. offices in Seymour Street, London



Main entrance, in Seymour Street



Main inquiry bureau, on ground floor

Completion within so short a period is believed to be a record for a building of this size. Possession of site was given on February 6, 1933; building proper began on March 4; and the official opening took place on Monday last, February 12.

The architects for the building were Mr. A. V. Heal, F.R.I.B.A., and Mr. W. H. Hamlyn, A.R.I.B.A., the structural engineer for the steelwork was Mr. B. L. Hurst, M.Inst.C.E., and the general contractors were John Mowlem & Co. The building consists of basement, ground floor, and eight upper floors, and has been designed, first, to enable the members of the staff—some 1,300—to produce their best work, by providing them with offices which have the greatest possible convenience and comfort; and secondly, by means of planning an adequate system of intercommunication to enable each department to function either as a unit or in relation to each of the other departments with the highest efficiency. To obtain maximum and uniform distribution of daylight on all floors the building has been designed round a central lighting court with a subsidiary light well at the rear. The only permanent divisions in the building are the walls forming the main corridor, for all other divisions removable unit partitions are employed.

Euston House is constructed on the steel frame principle. The floors are of hollow tile and concrete construction, and a filling of 2½ in. of pumice concrete is laid over the constructional floors. In this are placed the under-floor ducts and conduits for the electric lighting, telephone and bell wires. On top of the pumice concrete is laid cement flooring ¾ in. thick, to which the rubber or linoleum floor coverings

are sealed. The walls are of brickwork faced externally to the street with Travertine on the ground floor, Portland stone on the first, and thence with multi-coloured facing brick and Portland stone dressings on the upper storeys. The walls of the internal courts are faced with ivory-white faience slabs with black bands at the levels of the window-sills and heads. The flat roof is formed of hollow tiles and concrete, and on this is placed a layer of 2-in. thick cork insulating slabs over which the asphalt covering is laid.

Architectural Treatment

The architectural treatment of the exterior has been influenced considerably by the practical requirements of the interior. The continuous windows, separated by slender structural units, have dictated a horizontal panel treatment on bold, simple lines which has provided the basis of a restrained modern architectural note throughout the exterior. Extremes of modernism have been avoided, while a reasonable introduction of suitable mouldings for weathering purposes has added interest to the design and has assisted in avoiding the uninteresting flatness characteristic of some modern buildings. In furthering this object, the metal windows have been formed into shallow bays which will result in a variation of light reflection on the surface of the exterior. The vestibule, entrance hall, and inquiry bureau are designed in a scheme of ivory (subiaco) and Irish black marble, the latter being confined to the columns and skirtings. The design of these rooms is simple and dignified, the material and proportions rather than elaborate detail being relied upon for richness of effect. In the entrance hall and bureau, as well as

for the electric lights, stainless steel and silver bronze fittings are used, while a colour-note is introduced in the lift doors, cars and electric light fittings which are finished in a modern scheme of lacquer green and silver.

Allocation of Space

In allocating the office accommodation particular attention has been paid to the convenience of members of the public visiting Euston House. The greater part of the ground floor is allocated to the offices of the London District Passenger Manager, Mr. J. A. Milligan. There is an inquiry bureau immediately opposite the main entrance into the building from Seymour Street. Here expert assistance is available for public guidance in regard to services and facilities. Telephones and means for writing and posting letters are provided for the convenience of the public making use of the inquiry bureau. The Chief Commercial Manager, Mr. Ashton Davies, and the Chief Operating Manager, Mr. C. R. Byrom, and their staffs occupy floors 1 to 6. In order to expedite the quotation of rates and charges for the many varieties of traffic, over 160 persons, previously located at Miller Street (Camden Town) and at Derby are being accommodated on the second and third floors of the new building. While the Chief Operating Manager, Mr. C. R. Byrom, is ultimately responsible for the signalling of the line, the provision and technical precision of the signalling equipment is the responsibility of the Signal and Telegraph Engineer, Mr. A. F. Bound. To facilitate co-operation between the staffs of these two offices the seventh floor has been allocated to the Signal and Telegraph Department. The Chief Stores

Superintendent, Mr. S. J. Symes, and his staff are being housed on the eighth floor. The north wing of this floor is allocated mainly to the Stores Pattern Room, where standard samples of articles purchased in large quantities are displayed for inspection by firms tendering for their supply. Mr. G. L. Darbyshire, Chief Officer for Labour and Establishment, who was responsible for the allocation of offices and staffing of the building, is to be congratulated on the effective use which he has made of the new accommodation.

Internal Planning and Equipment

The typing staff has been concentrated in offices so situated as to give the readiest accessibility to and from the points at which its work originates.



Sir Josiah Stamp and the Hon. Oliver Stanley, Minister of Transport, at the opening ceremony of Euston House

Similarly, care has been taken to secure the shortest possible "lines of communication" between connecting sections throughout the building, and all unnecessary walking has been obviated. The building includes a small cinema where customers may see illustrated on the screen the particular services in which they are interested. Films are also used in the study of problems affecting the operation of trains and the working of goods depots. Four electric passenger lifts with a speed of 450 ft. a minute are installed adjoining the main entrance hall, and a goods lift at the rear of the building. For correspondence, an electrically-driven elevator, serving all floors from a main station on the ground floor, has also been installed. Sound-proof partitions have been provided between the rooms, and in certain cases the ceilings have been treated with a special sound-absorbing material.

Euston House has its own fully equipped sub-station and switchroom taking high-tension current at 11,000 volts from the L.M.S. generating station at Stonebridge Park. Feeders to the various sections of the building for lighting and power are run through trenches in the basement floor and are continued up a riser space provided from basement to top floor and roof. Section control apparatus is provided, each floor having independent controls. In addition to the floor lighting and roof machinery feeders, copper bus-bars have been provided through the full length of the riser space for dealing with present and future power and heating requirements on all floors. Connections from this bus-bar supply can be taken to any position on all floors through a floor fibre duct system. The lighting distribution fuse boards on each floor are controlled by apparatus fixed in the riser space. These boards are fitted with small circuit breakers controlling each lighting sub-circuit. In the offices the general lighting is by means of opal glass enclosed unit fittings mounted on the ceilings. This system is adaptable for either partitioned rooms or large open offices, and provides flexibility in relation to movable partitions. Fittings of special design are provided in the entrance hall, main staircases and corridors. The inquiry bureau is illuminated by windows and by laylights in the ceilings. The stonework of the front of the building and the tower are floodlit, and the tower is also equipped with "L.M.S." Neon signs.

Heating and Air Conditioning

To supply the 600 radiators, which are of an improved type giving a flush finish under the windows and sized to suit the stanchion dimensions, 10,000 gallons of hot water are circulated hourly through the five miles of heating pipes. A special feature of the radiators is that they have additional waterways to induce convection currents sufficient to prevent down draughts from the large windows. The heating plant is "zoned" into five main sections, viz., north, south, east, west, and central, in order to ensure ease of control and maximum economy of operation. These are each controlled by valve operation from a control room in the basement.

The air is completely changed every 20 minutes by means of a ventilating system whereby the air is taken in through two large air-conditioning plants on the roof, washed, conditioned and warmed and then circulated through the offices under temperature and humidity control. Large 100 h.p. fans handle over 7,500,000 cub. ft. of air every hour. The control room and boiler house are below ground level. By the operation of a single switch the engineer in charge can regulate the temperature at 25 different positions in the building. The boiler plant comprises three economic boilers with a total output of 11,500,000 B.Th.U. an hour. They are mechanically fired

with a coal conveyor plant to deliver the coal from bunkers to the boiler hoppers without manual labour. The entire water supply is treated, at the rate of 3,000 gallons an hour, by a water-softening plant, whence electric pumps deliver it to the storage tanks of 12,000 gallons capacity in the top storey of the tower.

Labour-saving devices to facilitate internal cleaning include a waste paper chute with reception points on each floor conveys all scrap paper into a central tip in the basement. Adjoining this central tip is a baling machine to compress and pack the waste material for disposal. A central vacuum cleaning plant and an electric scrubber-polisher for cleaning and polishing floor surfaces are also employed.

Fire detection is by means of an automatic electric installation, all rooms being fitted with a thermostatic detector contact unit, which, on a pre-determined rise in temperature, operates the alarm. The detectors are connected in section on each floor to indicator boards which are interconnected throughout the building to main indicator boards in the entrance hall and in the caretaker's quarters, showing in which section of the building the detector has operated. In this way the exact location of an outbreak of fire would be immediately known. Alarm bells are provided on each floor, and an electrically-driven syren is affixed to the outside of the building.

Electric clocks are installed throughout. The master clock is installed in the telephone cable room, situated in the basement, and is capable of regulation to within one second a week.

Opening Ceremony

Euston House was formally opened on Monday afternoon by the Hon. Oliver Stanley, Minister of Transport.

Sir Josiah Stamp, Chairman of the Company and President of the Executive, L.M.S.R., who presided, said he was happy to bring together three great institutions, the Ministry of Transport, the L.M.S. Railway, and the House of Derby and Stanley. He welcomed Mr. Stanley as a member of a family having a long and remarkable record and also some associations with the old Midland Railway.

Mr. Oliver Stanley said he had pleasure in performing the opening ceremony, and had only to press two buttons before him when a Neon sign would light up the top of the building and a lift ascend from the bottom. He congratulated the railway company on its courage and enterprise in erecting such a building as Euston House in a time of depression. The outstanding merit of the building was its simplicity of design; it looked what it was. First impressions were important. Some offices looked like Gothic cathedrals.

In the building there was even a room for showing films. Modern methods of publicity demanded new methods to influence public opinion.

This new building showed the railway company's willingness to adopt modern methods. We were going through a bad time, and he wished the L.M.S.R. and other railways every success in their plans for development. It was almost impossible to over-emphasise their importance as employers and buyers of materials, and their prosperity meant the prosperity of the country. He had tried to do all he could to assist on level terms both rail and road transport, to provide the public with the cheapest and most efficient forms of transport. To-day he believed there was new life, new hope, and new enterprise in industry; there was a readiness to face the future with confidence, and an expression of that spirit was this new building of the L.M.S.R.

Sir Josiah Stamp had referred to the connection of his family with the London Midland & Scottish Railway. He had heard—it was probably a baseless rumour—that his family's connection with the railways went even further back, and that "On, Stanley, on" and "Charge, Chester, charge" the last words attributed by Scott to Marmion were the original instructions to the traffic manager of a railway.

Among those also present were:—

Ministry of Transport: Sir Cyril Hurcomb and Lt.-Col. A. H. L. Mount. *Directors of the L.M.S.R.:* Sir Alan Garrett Anderson, Sir John Beale, Mr. E. B. Fielden, Major Sir Ralph and the Hon. Lady Glyn, Mr. J. Bruce Ismay, Lord Knutsford, General the Hon. Sir Herbert Laurence, Messrs. A. E. Pullar, G. R. T. Taylor, Douglas Vickers, and Sir Thomas Williams. *Officers of the L.M.S.R.:* Messrs. T. E. Argile, A. W. Barrett, H. P. M. Beames, A. F. Bound, W. P. Bradbury, C. R. Byrom, S. B. Carter, A. L. Castleman, W. H. C. Clay, G. L. Darbyshire, Ashton Davies, A. Eddy, T. Firth, S. H. Fisher, Captain J. W. Harris, Sir Harold Hartley, Messrs. F. A. C. Leigh, J. A. Milligan, H. V. Mosley, T. W. Royle, S. J. Symes, E. Taylor, H. L. Thornhill, A. E. Towle, D. C. Urie, W. K. Wallace, E. Wharton, W. V. Wood.

The heads of many commercial firms were also present at the ceremony.

Floating Hotel for "The Royal"

A floating hotel off Parkeston Quay, Essex, will be an attractive feature of the Royal Agricultural Society's Show which will, for the first time, be held at Ipswich, Suffolk, between June 3 and 7. A fine show ground has been secured just west of the L.N.E.R. Ipswich-Norwich main line, about 1½ miles north of Ipswich station. The L.N.E.R. is making special arrangements to deal with the show traffic which, in addition to necessitating many special trains, will demand new sidings to accommodate more than 200 wagons, special loading wharves, and new roadways. The floating hotel will be provided by the L.N.E.R. berthing one of its passenger steamers, used on the Harwich-Antwerp nightly service, off Parkeston Quay, from July 2 to 7. Accommodation will be provided aboard at an inclusive charge of 18s. a night, which will include transport between Shotley pier and the vessel, dinner on board, a private cabin, and breakfast. Reservations are being made by Robert Bond & Son, Ipswich.

Railway and State Relationships Abroad

At the Great Western Railway Lecture and Debating Society meeting at Paddington station, on February 8, Mr. C. E. R. Sherrington, M.A., of the Railway Research Service, gave an informative survey of the present relationships between railways and States in overseas countries. Mr. A. S. Quartermaine, Assistant Chief Engineer, Great Western Railway, presided.

The railways of the principal European countries, as well as the North American and Dominion lines, were brought under review in the course of the lecture. Commencing with France, it was explained that of the seven main line railways or *réseaux*, only two, namely, the Etat and the Alsace-Lorraine, are wholly Government-owned. These are semi-autonomous, in that their accounts are separated from the French national budget, and the systems are expected to be self-supporting. The Directors are nominees of the Government. The remaining five systems, *i.e.*, Nord, P.L.M., Est, Midi, and Paris-Orleans, are not company lines in the British sense of the term, the operating companies holding leases of the land on which the lines are constructed, all the leases being due to expire between 1950 and 1960. This fact necessitates provision for amortisation of capital, which in turn affects rates and fares. Under the French Railways Act, 1921, a Common Fund was set up for all French railways. Into this fund all surplus profits are payable for the assistance of the less prosperous among them. As a result of persistent annual deficits, the Common Fund is indebted to the extent of 150 million pounds, although it should be borne in mind that provision has first been made for capital amortisation and taxation.

The Reichsbahn of Germany is the only main line railway in that country. In theory it is entirely autonomous. The whole of the ordinary shares of the Reichsbahn are held by the Government, and no return has yet been paid on them. On the other hand, preference shares, some of which are privately held, have paid dividends. Although, perhaps, not a state railway in theory, its connection with the Government is an extremely close one. Trade depression has had a markedly adverse effect on its operating results. In 1932, interest payments on the nominal capital of 27,000 million RM. amounted to only 100 million RM., and this payment was made from reserves, as there was an operating deficit of 67 million RM.

The same story of deficits had to be told of the Belgian National Railways. The Swiss Federal Railways showed up rather better financially, having the same operating surplus (70 million francs) in 1932 as in 1913. During the intervening period, however, the capital of the Swiss railways was doubled. None of the railway deficits could be put down to inefficient administration. Before proceed-

ing to consider the Dominions and the United States railways, Mr. Sherrington outlined the present railway position in Italy, Poland, Denmark, Holland and Czechoslovakia.

In regard to the Canadian National Railways, the speaker said that the serious deficits must be attributed not to inefficient administration but to the Canadian people's preference for low rates at the cost of Governmental financial assistance rather than higher charges which would yield a return on capital. Trade depression and road motor competition had created deficits on the Australian state owned railways which, between 1915 and 1931, reached the enormous total of 68 million pounds. Not nearly so serious is the position in South Africa and New Zealand. The latter Dominion, said Mr. Sherrington, led the way in the matter of Government regulation of road transport, having some time ago passed legislation somewhat similar to our Road and Rail Traffic Act of 1933. The United States was referred to as the only important industrial country, other than Great Britain, to adhere completely to company ownership and operation. Despite severe road competition, the railroads in that country succeeded in earning 2 per cent. in 1931, 1.25 per cent. in 1932, and 1.75 per cent. in 1933 on their total property investment. There was an interesting general discussion at the conclusion of the lecture.

Annual Meeting of the Signal Engineers

The annual meeting of the Institution of Railway Signal Engineers took place on Wednesday evening last, when Mr. Ralph S. Griffiths gave his presidential address. After referring to the fact that the whole of his 40 years' business career had been spent in the service of signal contractors and to the desirability of overseas members, when home on leave, making their presence in this country known to the Hon. Secretary of the Institution, Mr. Griffiths proceeded to deal with the main theme of his address, namely, the history of the mechanical locking frame, a précis of which is given on page 261.

Earlier in the evening, after Mr. Griffiths had taken the chair in place of the retiring President (Mr. W. Challis), Mr. H. E. Morgan was elected the vice-president and Mr. A. B. Wallis and Mr. M. G. Tweedie were re-elected the hon. treasurer and hon. secretary respectively. The new Council consists of Messrs. J. Boot, F. L. Castle, G. H. Crook, H. H. Dyer, S. L. Glenn, E. W. Hallam, C. M. Jacobs, W. R. Jones, T. S. Lascelles, H. W. Moore, R. Falshaw Morkill, A. Moss, A. Oldham, H. M. Proud, F. W. Reed and W. S. Roberts. Messrs. C. H. Hills and L. M. J. Knotts were re-elected auditors.

(See editorial on page 249)

QUESTIONS IN PARLIAMENT

Chinese Railway Loans

Mr. Moreing on February 12 asked the Secretary of State for Foreign Affairs if he would state who were responsible for the payment of interest and amortisation of the Peking-Mukden Railway loan; from what source payments were made; whether any offer had been made by the *de facto* government of Manchukuo to bear a proportionate share of the charges; and, if so, whether such offer was accepted by the Chinese Government.

Sir John Simon.—The Peking Mukden Railway loan is a first charge upon the railway and its revenues, and principal and interest are guaranteed by the Government of China. After the military operations in Manchuria in the autumn of 1931, the service of the loan was effected by that part of the railway lying within Manchuria for which a separate railway administration—the Feng Shan Railway—had been set up. The payments were made largely out of the funds accumulated by the Peking Mukden Railway in Mukden, upon which an embargo had been laid. These were exhausted about February, 1933, and about the same time it was arranged that the necessary payments should be made by the recently established Railway Control Board. About the middle of 1933 an arrangement was made between the Japanese military authorities and the Chinese administration of the railway, in connection with the resumption of through traffic, in accordance with which the Feng Shan railway assumed full responsibility for the service of the original Peking Mukden Railway loan, while the Chinese administration of the remaining portion of the railway was to be responsible for the various other loans secured upon the surplus earnings of the railway. This arrangement is, I understand, being carried out so far as the Peking Mukden Railway loan is concerned.

Mr. Moreing asked the Secretary of State for Foreign Affairs if he would state what reply His Majesty's Minister in China had received from the Chinese Government to his representations on the subject of the continuing default on the Tientsin-Pukow Railway loan; whether he had yet received any information regarding the earnings of the railway during the past 12 months; and whether, as promised, payments were being regularly made into the reserve account intended to serve for the eventual liquidation of the loans.

Sir John Simon.—In reply to renewed representations on the subject from His Majesty's Minister, the Chinese Minister for Foreign Affairs, in a note dated December 2, 1933, stated that every effort was being made to provide for payments into the special reserve account intended to serve for the eventual liquidation of the loans.

Certain comparatively small sums have been deposited irregularly, and the instalment due for March, 1933, is now completed, the total account now standing at \$509,352-83. No information regarding the earnings of the railway during the past twelve months has yet been received. The position is far from satisfactory, and constant efforts are and will continue to be made by His Majesty's Legation to secure an adequate liquidation of the sums in default.

Mr. Moreing asked the Secretary of State for Foreign Affairs if he had any information as to the present position with regard to arrears of interest due to British bondholders from Chinese railways; and whether any of the railways in arrears had recommenced payment and, if so, which.

Sir John Simon.—On February 7,

1933, when the last comprehensive estimate was made, the arrears of interest due to British holders of Chinese railway bonds was understood to amount to more than five million pounds sterling. Since then, in spite of a few repayments made on the Shanghai-Nanking Railway Loan of 1904, the Honan Railway Loan of 1905, the Shanghai-Hangchow Ningpo Railway Loan of 1908 and the Tientsin-Pukow Railway Loan (German issue of 1908), I regret to say that the total amount of indebtedness has somewhat increased. His Majesty's representative in China has, under instructions from His Majesty's Government, recently impressed once again upon the Chinese Government the necessity of taking the situation in hand without delay, and has suggested that the competent departments of the Chinese Government should forthwith, in consultation with the Commercial Counsellor of His Majesty's Legation, devise means for resuming the interest services of the loans now in default.

Dictaphones on L.N.E.R. Expresses

(See also illustration on page 271)

Below we reproduce the first letter dictated and transcribed by the new Dictaphone typing service that was inaugurated by the L.N.E.R., in conjunction with the Dictaphone Co. Ltd., on the 5.30 p.m. express from King's Cross to Newcastle on Monday last. It was received by the Editor of THE RAILWAY GAZETTE on the following morning, having been posted at one of the stopping places *en route* to Newcastle.

"DICTAPHONED"
Between
Newcastle and London
and Typed on the train



12th February, 1934

Mr. J. A. Kay,
The "Railway Gazette"
33, Tottenham Street,
LONDON, W. 4, 1.

Dear Sir,

I am dictating this letter on the 5.30 p.m. train from King's Cross to Newcastle.

As you no doubt know, the L.N.E.R. have inaugurated a new typing service on two of their north-east coast expresses for business men who wish to devote the five hours' journey time, in whole or in part, to useful work.

I am dictating this to a Dictaphone in a reserved compartment. Travellers may engage the special dictating compartment for any time on the journey which suits them best. An expert operator will be on the train to assist those who are not familiar with the system of dictating, and additional machines can also be carried for use in passengers' own compartments where circumstances permit. As the Dictaphone operates from the train lighting current, which is supplied at 22 volts, it can be plugged into any compartment where lamp sockets are available.

No doubt you will be interested to know that this is the first letter to be dictated on an L.N.E.R. train.

Yours faithfully,

J. A. Kay

As an experiment this service, which it is considered should be particularly acceptable to business men, is being provided on two L.N.E.R. trains daily, the 5.30 p.m. from King's Cross to Newcastle and the 8.15 a.m. from Newcastle to King's Cross. Any passenger

who wishes to dictate a letter may do so either in the compartment in which he or she happens to be travelling, or, if privacy is desired, in a compartment reserved for the purpose. The charges are moderate, threepence a folio being the standard rate. In the case of a passenger wishing to maintain secrecy, he may, after dictating in the private compartment, purchase the cylinder outright for three shillings and have it despatched back to his own office for transcription. The Dictaphones used are portable models, specially sprung to absorb any motion of the train, and they may be plugged into the ordinary carriage electric-light socket when required for use.

The advantage of the Dictaphone over the ordinary stenographer, such as was employed in the pioneer train-typewriting bureau which, as we reminded our readers in the Scrap Heap last week, was first introduced by the old L.N.W.R. on its London-Birmingham expresses in 1910, is that the Dictaphone enables the typist to transcribe during the whole, instead of only half, the journey time. Moreover, the actual handwriting operation, which even on a modern luxury train is always tiresome, is also eliminated.

LATEX UPHOLSTERY.—The Dunlop Rubber Co. Ltd. on Tuesday last conducted a party of press representatives to the Fort Dunlop works, Birmingham, and demonstrated the manufacture of Dunlopillo seating. This product was illustrated and described in THE RAILWAY GAZETTE of November 4, 1932, when suggestions were made for its application to railway work, which have had interesting results.

Railway Conciliation Machinery

The Special Joint Committee on Machinery of Negotiation for Railway Staff has issued its report. The Committee included representatives of the four group railways and of the three railway trade unions, namely:—Mr. Kenelm Kerr, L.N.E.R. (Chairman); Mr. J. F. Lean, G.W.R.; Mr. G. L. Darbyshire, L.M.S.R.; and Mr. O. Cromwell, Southern Railway; Messrs. W. Dobbie, J. Henderson, and J. Marchbank, N.U.R.; Messrs. G. H. Tyler and J. Bromley, A.S.L.E.F.; and Messrs. F. B. Simpson and A. G. Walkden, R.C.A. Mr. F. Gilbert, Secretary of the Central Wages Board, acted as Secretary to the Committee. The formation of the Committee was the result of the companies having given on March 3, 1933, twelve months' notice pursuant to Section 62 of the Railways Act, 1921, to determine as from March 3, 1934, the reference to the Central Wages Board, or, on appeal, the National Wages Board, as reconstituted under that Act, of all questions relating to rates of pay, hours of duty or other conditions of service of employees to whom Part IV of that Act applies.

A series of meetings was held at which the Committee reviewed the whole of the existing machinery of negotiation and the general considerations and principles involved. Following upon these meetings the representatives of the companies drafted a report, with a view to its adoption by the representatives of the unions as a joint report to the parties.

The machinery of negotiation proposed by the railway companies makes provision for joint meetings between a union or unions and the railways staff conference acting on behalf of the four railway companies, a number of joint lines and joint stations and the Railway Clearing House. This procedure is already in existence and has proved of great value to the parties, but definite provision for it has not hitherto been made in the machinery of negotiation. The proposed machinery also provides for (a) the establishment of a Railway Staff National Council, the constitution and functions of which would be broadly similar to those of the Central Wages Board; (b) the reference of certain defined matters, and in particular questions of "interpretation," to the Chairman of the proposed Railway Staff National Tribunal for decision; and (c) the establishment of a Railway Staff National Tribunal.

The proposed function and duty of the Railway Staff National Council is to consider questions as to standard salaries, wages, hours of duty and other standard conditions of services within the scope of the 27 national agreements (1919-1933) mentioned in the appendix to the draft. Such questions not to be carried beyond the

Railway Staff National Council unless involving "interpretation" of a national agreement, or unless agreed by the Council to be questions of major importance. No question to be referred to the Council unless there has been a discussion at joint meetings between railway companies and trade unions and failure to agree.

The proposed Railway Staff National Tribunal to consist of three members:—(i) One member to be selected from time to time by the railway companies; (ii) one member to be selected from time to time by the trade unions; (iii) a chairman to be appointed by agreement between the railway companies and the trade unions. No director or official

of any of the railway companies or of the Railway Clearing House, and no official or member of any of the trade unions is to be eligible for membership of the Tribunal. No issue is to be referred to the Tribunal except by agreement between the railway companies and unions concerned and upon agreed terms of reference. Decisions of the Tribunal, whether unanimous or by a majority, are to be binding.

The statement issued by the union representatives on the joint committee shows that they accept in principle the setting up of a Railways Staff National Council, but with regard to the proposed Tribunal they see no reason for any fundamental change in the existing provision of the National Wages Board, and they are not prepared to agree that proceedings before such a Tribunal or Board should be private.

RAILWAY AND OTHER REPORTS

Southern Railway.—The Secretary writes, February 12:—"The directors have resolved to recommend the proprietors to declare a dividend of 3 per cent. on the preferred ordinary stock for the year 1933, as compared with 1 per cent. for 1932. The balance carried forward is £224,927, as compared with £207,173 carried forward from 1932. It is proposed to make the dividend payable on Tuesday, March 6."

Great Western Railway.—The Secretary writes, February 14:—"The gross receipts of the Great Western Railway Company from railway and ancillary businesses for the year 1933 were £38,687 less than for the year 1932. The gross expenditure for the year was £459,548 less, or 1.88 per cent. Miscellaneous net receipts (less charges) decreased by £51,703. The net revenue for the year amounted to £4,828,561, an increase of £369,158. The balance brought forward from last year was £42,989, and after including £71,529 in respect of profit on realisation of investments and appropriating £1,350,000 from the contingency fund, the directors have decided to recommend the payment of a dividend for the half-year ended December 31 of £2 15s. per cent. on the consolidated ordinary stock, making with the interim dividend £3 per cent. for the year. The balance carried forward is £40,679. During the year certain reserves—mainly in respect of income tax—have been released as they are no longer required, and this has enabled the contingency fund to be augmented by £850,000. The net reduction in the fund is therefore £500,000. The dividend warrants will be posted on the 5th proximo." Dividends have been as follow:—

Year	1933	1932	1931	1930	1929	1928
June half	.. 5½	1	3	4½	5½	3
Dec. half	.. 5½	5	3	6½	9½	7
	3	3	3	5½	7½	5

Canadian Pacific Railway.—A statement by the directors was issued on February 12 to the effect that while

they were naturally gratified by the improvement in the company's earnings which began in December last, the results of operation for 1933 did not warrant dividends on the preference or ordinary stocks for that year.

Great Southern Railways.—The Secretary writes, February 9:—"Owing to the financial position of the company, the directors at their meeting to-day decided with regret that the payment of a dividend on the cumulative guaranteed preference stock and arrears due in respect thereof be deferred. No dividends are available on the preference and ordinary stocks of the company."

Manchester Ship Canal Company.—The directors, at a meeting on February 12, resolved to recommend the declaration of the following dividends at the ordinary general meeting to be held on February 26, viz.:—3½ per cent. on the Manchester Ship Canal Corporation preference stock, same as last year; 2 per cent. on the preference shares, as compared with 1 per cent. last year; 1 per cent. on the ordinary shares, as compared with ½ per cent. last year. £35,000 has been placed to reserve for contingencies and repairs, as compared with £25,000 last year, and £34,608 has been carried forward, as compared with £34,166 last year.

Belfast & County Down Railway.—Gross receipts for the year 1933 from the railway and ancillary businesses were £200,124, and expenditure £189,888 leaving net receipts of £10,236. The addition of miscellaneous receipts of £5,793 gives a total net income of £16,029. The directors regret that the results of the year's working do not permit the payment of any dividend on the 5 per cent. or the 4 per cent. preference stocks, or on the ordinary stock. Sufficient profits have, however, been earned during the second half of the year to discharge the statutory obligation as to payment of the interest on the 4½ per cent. A preference stock,

NOTES AND NEWS

Underground Railway for Istanbul.—In connection with a scheme of town planning, an underground railway, connecting the north and south ends of the city, is under consideration.

Cheaper G.W.R. Holiday Season Tickets.—The Great Western Railway announces reductions in price from 20 per cent. to 33½ per cent. of holiday season tickets, together with extensions of the areas for which they are available. They will be introduced on April 1, a month earlier than last year.

Southern Railway Pupils and Premium Apprentices Association.—The ninth annual dinner of the Southern Railway Pupils and Premium Apprentices Association will be held at the Charing Cross Hotel, London, on Friday, March 16. Former pupils or premium apprentices of the Southern or its constituent companies are invited to apply for further details to Mr. Eric L. Forge, 159, Desborough Road, Eastleigh.

Stephenson Locomotive Society.—On February 6, Mr. A. G. Williamson delivered a paper to the Stephenson Locomotive Society in London, dealing with the evolution and performance of single-wheeled locomotives. In the ensuing discussion the feasibility of using streamlined single-wheelers, fitted with all the latest refinements for hauling light express trains in this country at speeds up to 100 m.p.h., was suggested.

Manchester Inter-Terminal Bus Service.—A service of motor-buses has now been put into operation by the Manchester Corporation connecting the London Road, Victoria, Exchange, Central, and Oxford Road stations. These buses run at fairly frequent intervals, and in a measure provide the inter-terminal facilities which would have been given by the Manchester underground circle railway scheme, now in abeyance.

Electric Regeneration.—In a paper entitled "Regeneration as Applied to Direct-Current Electric Traction," read before the Institute of Transport on February 12, Mr. G. F. Sinclair, A.M.I.E.E., discussed the various systems of regenerative braking now used in conjunction with d.c. railway, tramway and trolleybus traction, noticing more particularly the rapid advance in light and simple equipment. In railway applications, the types used on the G.I.P., South African Government, and Midi Railways were described, and service results given.

Overseas Visitors to Great Britain and Ireland.—The official return of visitors on holiday from abroad to Great Britain and Ireland in respect of last December reveals that 1932 was a record year in this respect. A feature was the large number of European visitors, largely from France—where the

Travel Association has permanent representatives and a branch office—who came to London and the South Coast resorts on single day trips. On one occasion between eight and nine thousand French visitors spent a day in the metropolis; on another occasion there were over five thousand.

Free Lantern Lecture on the Roman Wall.—The L.N.E.R. has prepared a new set of lantern slides dealing with Tynedale and the Roman Wall. These slides, 80 in number, together with appropriate reading matter, may be borrowed free of charge from the Advertising Manager, King's Cross, or from York or Edinburgh.

"Return As You Please" Tickets.—The L.N.E.R. and G.W.R. announce that passengers holding cheap day tickets from Paddington, Westbourne Park, Acton, Ealing, or West Ealing to any station between Greenford and Princes Risborough, or Hayes and Reading, and on the Staines, Windsor, Henley-on-Thames, and Maidenhead - High Wycombe branch lines, may return from any other station in this area to the issuing station, or to Marylebone from the G.W. and G.C. Joint Line stations, upon payment of the difference, if any, between the respective cheap day fares. Passengers holding tickets to G.W. and G.C. Joint Line stations, South Ruislip and Northolt Junction to Princes Risborough inclusive, returning from G.W.R. stations, or *vice versa*, must exchange the return portion of their tickets at the booking office before commencing the return journey.

2-4-2 Tank Locomotives, Mysore Railways.—Since the article on these engines was published in THE RAILWAY GAZETTE of February 2, pages 188 and 192, we have received a communication from the builder, W. G. Bagnall Limited, Stafford, respecting the service rendered by them in India. The advice which this firm has received states that the locomotives have given extremely satisfactory results on the initial tests in Mysore. They were put on a section of line having a ruling gradient of 1 in 100, and hauled two bogie coaches weighing about 26 tons thereon. The trial run was between Bangalore City and Chintamani, a distance of 62 miles. It was covered in four hours, this, however, including a considerable number of stops for examination at various stations. It was found that the acceleration was excellent and that, as soon as the engines were running at a reasonable speed, they could be notched up to 45 per cent. cut-off and later on to 20 per cent., at which they kept up a steady speed of 20 m.p.h. up the grades of 1 in 100. Careful test was taken of the coal consumption which worked out at about 16½ lb. a train-mile, including all the stops. We understand that the tank engines used on this service prior to

the introduction of these new ones consumed about 28 lb. per train mile. It is further stated that the new engines have shown great economy in water as well as fuel consumption.

Leipzig Spring Fair.—The L.N.E.R. announces that cheap tickets to Leipzig will be issued from February 27 to March 10 to passengers holding fair membership vouchers. These tickets will be issued from London (Liverpool Street) as well as from Edinburgh, Glasgow, Manchester, Sheffield, and other principal stations in the North of England from which there are express restaurant car services for the Harwich-Hook of Holland and Harwich-Flushing routes.

The Royal Scot to be exhibited at Castle Bromwich.—The Royal Scot train, now touring Great Britain following its visit to Canada and the United States, will be exhibited at the British Industries Fair at Castle Bromwich, Birmingham, from February 19 to March 2. The train, consisting of the *Royal Scot* locomotive and eight coaches, will be drawn up on a siding outside the main fair building, and the same crew who accompanied it to America will be in attendance. Over 700,000 persons have already inspected the train at various places on the L.M.S. system.

L.M.S. Ambulance Movement Progress.—The annual report of the L.M.S. Railway ambulance centre for England and Wales states that 8,943 members of the staff were successful in examinations in 1933, an increase of 114 over the previous year. The Derby, Nottingham and Sheffield district had the largest number (848) of successful students. Other important districts were London (824), Manchester (540), Birmingham (513), Northampton, &c. (452), S.W. Lancs. (446), Liverpool (411), Crewe, Stafford and Shrewsbury (409), East Yorks (407) and Chester (405).

B.I.F. Travel Facilities.—For the British Industries Fair, which is being held from February 19 to March 2, season tickets for a minimum of seven days, commencing on any day of the week, will be issued from any L.M.S. station to either Castle Bromwich, Birmingham, or London, and from all principal G.W.R. stations to Birmingham or London. Each weekday a special train service will be in operation between Birmingham (New Street) and Castle Bromwich, and a number of L.M.S. expresses will stop specially at the latter station. From London (Euston) a special through restaurant car train to Birmingham (New Street) and Castle Bromwich will leave Euston at 9.17 a.m. each weekday except Saturday, February 24, returning from Castle Bromwich at 6.3 p.m. Seven-day season tickets between Euston and Castle Bromwich will be issued at £4 17s. 4d. first class and £2 18s. 4d. third class. G.W.R. seven-day season tickets between Paddington and Birmingham will be issued at £4 12s. 8d. first class and £2 15s. 8d. third class.

Institution of Electrical Engineers' Dinner

A large company of members and guests attended the annual dinner of the Institution of Electrical Engineers on Thursday, February 8, at Grosvenor House, London. Mr. P. V. Hunter, the President of the Institution, was in the Chair. After the loyal toasts, the Hon. Oliver Stanley, Minister of Transport, proposed "The Institution of Electrical Engineers." He said that he regarded the institution in a very friendly way, because of his former association with the Southern Railway, in which electrification had produced excellent results; he hoped that the extension of electrification now envisaged would prove equally gratifying. That electricity itself was booming was confirmed by the figures of units generated, issued by the Electricity Commissioners. A record output had been achieved by the London Power Company, which, in one period of 24 hours, just before Christmas, generated no less than 5,600,000 units. The National Grid had raised the pre-stige of British electrical engineers.

Mr. Hunter, replying, referred to the regretted absence of H.M. Postmaster-General, whom he congratulated upon promotion to Cabinet rank. The electrical industry might well follow the example of the Postmaster-General and the railways in appointing a Public Relations Officer.

Lt.-Col. K. Edgcombe, a past president, proposed the health of the guests, to which Lord Rutherford of Nelson replied, making reference to recent advances in knowledge of the fundamental electrical structure of matter. Shortly after ten o'clock the company adjourned for a Reunion. Many eminent electrical engineers were present, including pioneers such as Col. R. E. B. Crompton and Mr. W. M. Mordey. Others present, of special railway association, included Messrs. P. R. Boulton, E. T. Brook, A. E. L. Chorlton, Sir Hugo Hirst, Bt., Sir C. W. Hurcomb, C.B., Mr. J. M. Kennedy, Lt.-Col. F. A. Cortez Leigh, Messrs. A. L. Lunn, J. H. Millen, H. W. H. Richards, and Roger T. Smith.

British and Irish Railway Stocks and Shares

Stocks	Highest 1933	Lowest 1933	Prices	
			Feb. 14 1934	Rise/ Fall
G.W.R.				
Cons. Ord.	55½	31	57	+1
5% Con. Prefce.	109½	69½	111½	-½
5% Red. Pref. (1950) ..	109½	87½	112½	-
4% Deb.	108½	99½	106	-1
4½% Deb.	108	100½	110½	-
4½% Deb.	116	106	117½	-
5½% Deb.	128	117½	128½	-
2½% Deb.	65	60	64½	-
5% Rt. Charge	124	111½	125½	+1
5% Cons. Guar.	122	103	124½	-
L.M.S.R.				
Ord.	297½	121½	251½	-½
4% Prefce. (1923) ..	51	17	52	+½
4% Prefce.	72	33½	78	+2
5% Red. Prf. (1955) ..	93	47½	97½	+1
4% Deb.	103½	89½	101½	-1
5% Red. Deb. (1952) ..	114	105	113½	-
4% Guar.	97½	68½	97½	-½
L.N.E.R.				
5% Pref. Ord.	221½	73½	191½	+½
Def. Ord.	10½	4½	9½	+½
4% First Prefce.	65½	19½	65½	+½
4% Second Prefce.	40½	12½	38	-
5% Red. Pref. (195) ..	83½	27	82½	-
4% First Guar.	94½	58½	94*	-½
4% Second Guar.	89½	48	88*	-1
3% Deb.	77	60½	75½	-½
4% Deb.	102½	80	100½	-½
5% Red. Deb. (1947) ..	112	102½	111	-
4½% Sinking Fund Red. Deb.	107½	98½	106½	-
SOUTHERN				
Pref. Ord.	71	27½	75	+6
Def. Ord.	24½	9½	21½	+2
5% Prefce.	107½	74	111	+2
5% Red. Pref. (1964) ..	107½	78½	112½	-
5% Guar. Prefce.	124½	102½	122½	-
5% Red. Guar. Pref. (1957) ..	115½	103½	115½	-
4% Deb.	107½	96½	106	-
5% Deb.	126½	114½	127½	-
4% Red. Deb.	107½	100	106½	-
1962-67				
BELFAST & C.D.				
Ord.	6	4	6	-
FORTH BRIDGE				
4% Deb.	99½	95½	100½	+1
4% Guar.	98½	94	100½	+1
G. NORTHERN (IRELAND)				
Ord.	7½	3½	5	-
G. SOUTHERN (IRELAND)				
Ord.	28	16	24½	-
Prefce.	24	12½	19½	-
Guar.	42	16½	40	-
Deb.	60	30½	60½	-
L.P.T.B.				
4½% "A"	117½	112	116	-
5% "A"	127½	119½	126	-
4½% "T.F.A."	111½	106	109½	-
5% "B"	122½	114	119	-1
5% "C"	86½	74½	84	-
MERSEY				
Ord.	16½	5	13	-
% Perp. Deb.	83	63½	85½	-
% Perp. Deb.	62	51	63½	-
% Perp. Prefce.	50½	27	49½	-

British and Irish Railway Traffic Returns

GREAT BRITAIN	Totals for 6th Week			Totals to Date		
	1934	1933	Inc. or Dec.	1934	1933	Inc. or Dec.
L.M.S.R. (6,941½ mls.)						
Passenger-train traffic ...	358,000	352,000	+ 6,000	2,123,000	2,068,000	+ 55,000
Merchandise, &c. ...	453,000	392,000	+ 61,000	2,580,000	2,231,000	+ 349,000
Coal and coke ...	283,000	276,000	+ 7,000	1,637,000	1,619,000	+ 18,000
Goods-train traffic ...	736,000	668,000	+ 68,000	4,217,000	3,850,000	+ 367,000
Total receipts ...	1,094,000	1,020,000	+ 74,000	6,340,000	5,918,000	+ 422,000
L.N.E.R. (6,339 mls.)						
Passenger-train traffic ...	237,000	237,000	—	1,399,000	1,388,000	+ 11,000
Merchandise, &c. ...	320,000	272,000	+ 48,000	1,865,000	1,554,000	+ 311,000
Coal and coke ...	262,000	249,000	+ 13,000	1,496,000	1,406,000	+ 90,000
Goods-train traffic ...	582,000	521,000	+ 61,000	3,361,000	2,960,000	+ 401,000
Total receipts ...	819,000	758,000	+ 61,000	4,760,000	4,348,000	+ 412,000
G.W.R. (3,750 mls.)						
Passenger-train traffic ...	146,000	145,000	+ 1,000	906,000	905,000	+ 1,000
Merchandise, &c. ...	176,000	160,000	+ 16,000	1,024,000	892,000	+ 132,000
Coal and coke ...	112,000	111,000	+ 1,000	671,000	670,000	+ 1,000
Goods-train traffic ...	288,000	271,000	+ 17,000	1,695,000	1,562,000	+ 133,000
Total receipts ...	434,000	416,000	+ 18,000	2,691,000	2,467,000	+ 224,000
S.R. (2,181 mls.)						
Passenger-train traffic ...	227,000	225,000	+ 2,000	1,374,000	1,344,000	+ 30,000
Merchandise, &c. ...	58,500	55,000	+ 3,500	342,500	313,500	+ 29,000
Coal and coke ...	35,500	38,000	- 2,500	219,500	216,500	+ 3,000
Goods-train traffic ...	94,000	93,000	+ 1,000	562,000	530,000	+ 32,000
Total receipts ...	321,000	318,000	+ 3,000	1,936,000	1,874,000	+ 62,000
Liverpool Overhead (6½ mls.)						
Mersey (4½ mls.) ...	4,038	3,803	+ 235	25,781	24,077	+ 1,704
*London Passenger Transport Board ...	502,400	—	—	15,882,800	—	—
IRELAND						
Belfast & C. D. pass. (80 mls.) ...	1,641	1,558	+ 83	10,779	10,682	+ 97
" " goods ...	569	559	+ 10	3,088	2,958	+ 130
" " total ...	2,210	2,117	+ 93	13,867	13,640	+ 227
Great Northern (562 mls.) pass. ...	6,950	800	+ 6,150	42,600	35,950	+ 6,650
" " goods ...	7,200	150	+ 7,050	45,050	38,150	+ 6,900
" " total ...	14,150	950	+ 13,200	87,650	74,100	+ 13,550
Great Southern (2,158 mls.) pass. ...	18,105	17,318	+ 787	107,017	105,550	+ 1,467
" " goods ...	32,795	28,128	+ 4,667	183,360	167,759	+ 15,601
" " total ...	50,900	45,446	+ 5,454	290,377	273,309	+ 17,068

* 32nd Week.

* ex-dividend.

CONTRACTS AND TENDERS

The Vickers Train Lighting Co. Ltd. has secured orders from the Metropolitan-Cammell Carriage Wagon & Finance Co. Ltd. for 30, and from R. Y. Pickering & Co. Ltd. for 20, sets of train lighting equipment of the Wolverton type for new L.M.S.R. coaches which, as recorded in our February 2 issue, these firms have under construction.

J. Stone & Co. Ltd. has received orders from the Metropolitan-Cammell Carriage Wagon & Finance Co. Ltd. for 20 sets, and from the Birmingham Railway Carriage & Wagon Co. Ltd. for 50 sets, of train lighting equipment of the Wolverton type for new L.M.S.R. coaches, part of the recent L.M.S.R. order above mentioned.

William Bobby & Co. Ltd. has secured an order from the L.M.S.R. for a locomotive water-softening plant of 10,000 gallons an hour capacity to be installed at Rufford.

Joseph Kaye & Sons Ltd., of High Holborn, W.C.1, and Leeds, has received orders for lock and key installations at several of the Underground stations of the London Passenger Transport Board, including Holborn, Kingsway, Knightsbridge, Acton Town, Enfield West, and Warren Street.

Enquiries have been issued by the French Minister for the Colonies for four tender locomotives and a number of diesel railcars for service on the Dahomey railways, French West Africa.

J. Parkinson & Son Ltd. has received an order from the Entre Rios Railway for a No. 3T universal milling machine.

James Archdale & Co. Ltd. has received an order from the Entre Rios Railways for a 32-in. heavy-duty vertical drilling machine.

The Churchill Machine Tool Co. Ltd. has received an order from the Entre Rios Railway for a 6-in. by 20-in. model B.Y. plain grinding machine.

John Lang & Sons Ltd. has received an order from the Entre Rios Railway for a 30-in. swing surfacing, boring, and screw-cutting lathe.

The Vaughan Crane Co. Ltd. has secured an order for one overhead hand power travelling crane for new oil storage for the Buenos Ayres Great Southern Railway.

Lacy Hulbert & Co. Ltd. has received an order for four patent portable petrol-driven air compressors for paint spraying equipment for the Buenos Ayres Great Southern Railway.

H. J. Skelton & Co. Ltd., on behalf of Usines et Boulonneries de Mariemont, has received an order for 140,000 steel coach screws for bearing plates for the Buenos Ayres Western Railway.

The Henricot Steel Foundry has received orders for 15,000 cast-steel bearing plates for 100 lb. B.S. rails

for the Buenos Ayres Great Southern Railway, and 40,500 cast-steel bearing plates for the Buenos Ayres Western Railway.

With further reference to the South African Railways and Harbours Administration's invitation to tender for the construction of 50 locomotives, the date for receipt has again been extended and tenders must now be in by March 26. We are informed that these engines are to have mechanically-operated fire doors and not mechanical stokers as stated on page 225 of last week's issue, in which the principal specified dimensions were given.

The following orders have recently been placed by the Crown Agents for the Colonies. In several instances more extended reference has already been made to them in this column:—

Furness Shipbuilding Co. Ltd.: Covered goods wagons.
Butters Bros. & Co.: Derrick crane.
Taylor Bros. & Co. Ltd.: Locomotive tyres.
Barford & Perkins Limited: Motor roller and accessories.
Tanges Limited: Ram pumps.
Aveling & Porter Limited: Road roller.
J. Baker & Bessemer Limited: Steel tyres.
Motherwell Bridge & Engineering Co. Ltd.: Structural steelwork.
General Electric Co. Ltd.: Telephones.
Gambrell Bros. & Co. Ltd.: Radio telegraph telephone equipment.
Standard Telephones & Cables Limited: Cables.
Siemens Bros. & Co. Ltd.: Telephone material.
G. Kent Limited: Water meters.
Manchester Water Meter Company: Water meters.

Park Royal Coachworks Limited has secured an order from the Nizam's State Railways for six single-deck bus bodies for Albion chassis.

John Baker & Bessemer Limited has received an order from the South Indian Railway for 1,098 locomotive tyres, and 1,200 carriage and wagon tyres.

The Tata Iron & Steel Co. Ltd. has secured an order from the East Indian Railway for a total of 760 tons of mild-steel billets.

Jessop & Co. Ltd. has secured an order from the Indian Stores Department for 300 carriage and wagon tyres, 2 ft. diam.

The Kumardhubi Engineering Works Limited has secured an order from the East Indian Railway for the supply of 1,300 cast-steel axleboxes.

Sir W. G. Armstrong Whitworth & Co. (Engineers) Ltd. has in hand an order from the Crown Agents for the Colonies for a 20-ton 122/140 b.h.p. diesel-electric shunting locomotive for the Ceylon Government Railways.

Tenders are invited, receivable by the Agent, G.I.P. Railway, Victoria Terminus, Bombay, by March 7, for the supply of enamelled panel plates and mouldings for one rake on the Grand Trunk Express service.

The United Steel Cos. (India) Ltd. has received orders from the Indian Stores Department, New Delhi, for 31 steel

locomotive tyres, 16 3 ft. 7 in. diam. steel wheels for motor coaches, and 60 Gibson type tyre retaining rings for motor coaches.

Tenders are invited by the Bengal & North Western Railway, receivable by the Managing Director at 237, Gresham House, Old Broad Street, London, E.C.2, by March 7, for 1,290 steel tyres for locomotives, carriages and wagons, and for 4,294 steel boiler tubes for locomotives.

Heatly & Gresham Limited, Bombay, has received an order from the Great Indian Peninsula Railway for a quantity of plain copper and flanged copper firebox plates and copper tube-plates for locomotives, the materials being subject to inspection by the India Store Department, London.

Shaw Wallace & Co. has secured orders from the Indian Stores Department, New Delhi, for one locomotive steel driving axle for XB class; 63 straight axles type W, and 33 type T and three type DT crank axles; and 3,000 bolts and nuts for tyre retaining rings.

Wright Pinhorn & Partners Limited has secured orders from the Indian Stores Department, New Delhi, for 452 steel engine tyres of various sizes; 186 carriage and wagon axles; four straight axles for suburban electric motor bogies; and three rough-turned straight axles.

The Krupp Indian Trading Co. Ltd. has secured orders from the Indian Stores Department, New Delhi, for 29 type SI, 35 type X, and 23 type Y straight axles, eight locomotive driving crank axles and one straight carbon steel crank axle with hoops; 165 steel locomotive tyres of various sizes; and 60 disc type wheel centres without tyres.

Forthcoming Meetings

Feb. 23 (Fri.).—**London Midland & Scottish Railway Company** (Ordinary General), Friends House, Euston Road, N.W., at 11.30 a.m.

Feb. 23 (Fri.).—**Mersey Railway Company** (Ordinary General), Winchester House, Old Broad Street, E.C.2, at 12 noon.

Feb. 27 (Tues.).—**Belfast & County Down Railway** (Annual General), Company's Terminus, Queen's Quay, Belfast, at 11.30 a.m.

Feb. 27 (Tues.).—**London Midland & Scottish Railway Company** (Special General), Euston Station, N.W.1, at 12 noon.

Feb. 28 (Wed.).—**Great Western Railway Company** (Annual General), Paddington Station, W.2, at 11.30 a.m.

Mar. 1 (Thurs.).—**Southern Railway Company** (Annual General), Southern House, Cannon Street Station, E.C., at 11.30 a.m.; followed by Special General (Wharncliffe) Meeting at 12.30 p.m.

Mar. 2 (Fri.).—**London & North Eastern Railway Company** (Annual General), Wharncliffe Rooms, Hotel Great Central, Marylebone, N.W., at 2 p.m.

OFFICIAL NOTICES

London Midland & Scottish Railway Company.

NOTICE is hereby given that a Special General Meeting of the London Midland & Scottish Railway Company will in compliance with the Standing Orders of Parliament be held at Euston Station, London, N.W.1, on Tuesday, the 27th day of February, 1934, at twelve o'clock noon precisely for the purpose of considering and if so determined of approving the undermentioned Bill and Provisional Order, namely:—

BILL PROMOTED BY THE COMPANY.
DEPOSITED IN PARLIAMENT.

London Midland & Scottish Railway Bill.

A Bill to empower the London Midland & Scottish Railway Company to construct a railway and to acquire lands; and for other purposes.

PROVISIONAL ORDER PROMOTED
BY THE COMPANY.
DEPOSITED WITH THE SCOTTISH
OFFICE.

London Midland & Scottish Railway Provisional Order.

A Provisional Order to authorise the London Midland & Scottish Railway Company to acquire lands in Scotland; to extend the time for the completion of certain authorised railways and works and for the purchase of lands; and for other purposes.

JOSHUA CHARLES STAMP.

Chairman.

OWEN GYLYNE ROBERTS.

Secretary.

Euston Station,
London, N.W.1.
12th February, 1934.

Great Western Railway Company.

NOTICE is hereby given that the Annual General Meeting of the Proprietors of this Company will be held in London, at Paddington Station, on Wednesday, the 28th day of February, 1934, at half-past eleven o'clock in the morning, for the general purposes of business, and at such meeting, which is hereby specially convened for the purpose, a Resolution will be submitted to the Proprietors authorising the Directors, as and when they may deem necessary, to exercise the additional powers in relation to capital conferred upon the Company by the Great Western Railway Act, 1933, as in that Act provided.

R. S. HORNE.

Chairman.

F. R. E. DAVIS.

Secretary.

Paddington Station,
London, W.2.
12th February, 1934.

Southern Railway Company

NOTICE is hereby given that the next Annual General Meeting of the Southern Railway Company will be held at Southern House, Cannon Street Station, in the City of London, on Thursday, the 1st day of March, 1934, at 11.30 a.m., for the purpose of receiving the Accounts for the past year and transacting general business.

AND NOTICE is hereby further given that the Meeting will be made a Special Meeting for the consideration of the following matter, viz.:—

To approve the making of a renewed Agreement between the Company and the Salisbury Railway & Market House Company for the working and management by the Company of that Company's Railway for a period of 16 years from 1st July, 1934.

F. H. WILLIS.

Secretary.

Waterloo Station, London,
12th February, 1934.

South Indian Railway Company Limited.

THE Directors are prepared to receive Tenders for the supply of:—

1. SPARE PARTS LOCOMOTIVE ENGINES,
2. CRANK AND STRAIGHT AXLES.

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Co. Ltd., marked "Tender for Spare Parts Locomotive Engines," or as the case may be, with the name of the firm tendering, must be left with the undersigned not later than 12 noon on Friday, the 2nd March, 1934.

The Directors do not bind themselves to accept the lowest or any Tender.

A charge, which will not be returned, will be made of 5s. for each copy of each Specification.

Copies of the drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, Westminster, S.W.1.

A. MUIRHEAD.

Managing Director.

91, Petty France,
Westminster, S.W.1.
14th February, 1934.

PATENTS for Inventions, Trade Marks, Advice, Handbook, and consultations free. King's Patent Agency, Ltd. (B. T. King, C.M.E., Registered Patent Agent, G.B., U.S., and Canada), 146a, Queen Victoria Street, London, E.C.4. 49 years' references. 'Phone City 6161.

The Bengal & North Western Railway Company Limited.

THE Directors are prepared to receive Tenders for the supply of:—

- 1,290 STEEL TYRES (LOCO., CARR. AND WAGON).

4,294 STEEL BOILER TUBES FOR LOCOS. as per Specifications to be seen at the Company's Offices.

Tenders addressed to the undersigned, and envelope marked "Tender for Steel Tyres," as the case may be, with name of firm tendering, to be lodged not later than noon on the 7th day of March, 1934.

For each Specification a fee of 10s. will be charged which cannot, under any circumstances, be returned.

The Directors do not bind themselves to accept the lowest or any Tender.

By Order of the Board,

W. R. IZAT.

Managing Director.

237, Gresham House,
Old Broad Street,
London, E.C.2.
February 14, 1934.

London & North Eastern Railway Company

NOTICE is hereby given that the Eleventh Ordinary General Meeting of the Proprietors of the London & North Eastern Railway Company will be held in the Wharnclyffe Rooms, Hotel Great Central, Marylebone, London, N.W.1, on Friday, the 2nd day of March, 1934, at 2 p.m. for the purpose of the general business of the Company.

Dated this 14th day of February, 1934.

By Order,

JAMES McLAREN.

Secretary.

Marylebone Station,
London, N.W.1.

Patents and Designs Acts, 1907 to 1932

NOTICE is hereby given that MICHELIN & CIE, of Clermont Ferrand, Puy de Dome, France, seek leave to amend the Specification of the Application for Letters Patent No. 403,340, for an invention entitled "Contact member for use in electric signalling systems for rail vehicles."

Particulars of the proposed amendment were set forth in No. 2351 of the Official Journal (Patents), published on 7th February, 1934.

Any person, or persons, may give Notice of Opposition to the amendment by leaving Patents Form No. 19 at the Patent Office, 25, Southampton Buildings, London, W.C.2, within one calendar month from the date of publication of the said Journal.

M. F. LINDLEY.

Comptroller-General.

Forthcoming Events

Feb. 16 (Fri.).—Institute of Transport (London), at Connaught Rooms, Great Queen Street, W.C.2, 6.30 for 7 p.m. Annual Dinner.

Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 5.30 p.m. Annual General Meeting.

Railway Correspondence and Travel Society, at Railway Clearing House, Seymour Street, London, N.W.1, 7.45 p.m. "Whitemoor Marshalling Yard," by Mr. H. M. Proud. Railway Students' Association (Edinburgh), at Goid Hall, St. Andrew Square, 7.30 p.m. "Gravitation Yards—with Special Reference to Whitemoor Yards," by Mr. H. H. Mauldin.

Feb. 17 (Sat.).—L.N.E.R. (Great Central) Lecture and Debating Society, at Alderman Newton School, High Cross Street, Leicester, 5 p.m. "Rail Adhesion and Tractive Effort," by Mr. J. G. Taylor.

Railway Students' Association (London), at 2.30 p.m. Visit to London Bridge Station, Southern Railway.

Feb. 17-24.—Wimbledon and District Model Railway Club, at Messrs. R. & N. Models, Streatham, Exhibition.

Feb. 19 (Mon.).—Wimbledon and District Model Railway Club, 90, High Street Mews, London, S.W.19. "Further Unknown Railways," by Mr. R. Shephard.

Feb. 19-Mar. 2.—British Industries Fair, at White City, London, and Castle Bromwich, Birmingham.

Feb. 20 (Tues.).—Institute of Transport (Metropolitan Students), at Institution of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. "Application of Modern Commercial Practice to Railways," by Mr. Ashton Davies.

Institute of Transport (Scottish), at Royal British Hotel, Princes Street, Edinburgh, 7.15 p.m. "A Comparison of the Organisation of the Main Line Railways of the United Kingdom," by Mr. H. G. Rampling. L.N.E.R. (Middlesbrough) Lecture and Debating Society, at Cleveland Scientific and Technical Inst., Corporation Road, 7.15 p.m. "Passenger Traffic by Road," by Mr. A. T. Evans.

L.N.E.R. (York) Lecture and Debating Society, at Railway Inst., Queen Street, 7 p.m. "York Station, Summer, 1933: a Retrospect," by Mr. G. W. Pattinson.

Feb. 21 (Wed.).—British Wood Preserving Association, at Auctioneers and Estate Agents' Inst., 29, Lincoln's Inn Fields, London, W.C.2, 6 p.m. "Creosote as a

Wood Preservative," by Mr. N. A. Richardson.

Institute of Transport (Newcastle), at Royal Station Hotel, 6 p.m. "Notes on a Century of Transport," by Mr. H. P. Currie.

Feb. 23 (Fri.).—L.N.E.R. (King's Cross) Literary Society, at Queen's Hall, Langham Place, London, W.1, 7.30 p.m. Smoking Concert.

Institution of Locomotive Engineers, at the Trocadero Restaurant, London, 6.30 for 7 p.m. Annual Dinner.

Railway Club, at Royal Scottish Corporation Hall, Fetter Lane, London, E.C.4, 7.30 p.m. Annual General Meeting.

Feb. 26 (Mon.).—City of Birmingham Commercial College, 7.30 p.m. "Selling Transport," by Mr. Ashton Davies.

Engineers' German Circle, at Inst. of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. "Fast Railcars on the German State Railways" and "With the Flying Hamburger from Hamburg to Berlin," by a Technical Expert of the German State Railways.

Feb. 28 (Wed.).—L.N.E.R. (Darlington) Lecture and Debating Society, at North Road Inst., 7.30 p.m. "Colour Light Signalling," by Mr. A. E. Tattersall.

Railway Share Market

The stock and share markets have been firm with a renewal of activity in home railway stocks which advanced under the encouraging influence of the L.M.S. complete accounts showing a further substantial saving in working expenses; the Southern dividend of 3 per cent. for the year on the preferred ordinary stock as against 1 per cent. for 1932; and the Great Western maintenance of 3 per cent. on the ordinary stock which has the effect of keeping the company's stock in the trustee list of securities.

The most pronounced movement in prices was in Southern preferred ordinary stock, which attracted large buyers and showed a rise of six points on balance of the week's business. The dividend of 3 per cent. was a half per cent. more than the market had been expecting. The Stock Exchange is proceeding on the assurance that 4 per cent. on this stock will be earned and paid for 1934, which

means that after allowing for the deduction of the present dividend the yield on the stock works out at nearly 5½ per cent. Optimistic views are now being taken of the prospects of the deferred ordinary stock, which is considered in some quarters to be under-valued on early dividend prospects in comparison with L.M.S. ordinary stock. Although the final dividend of the Great Western was raised so as to bring the total for the year up to 3 per cent., this had been more or less expected in the market and immediately following the posting up of the dividend there was a rush to take profits on the part of these operators who had bought early this year. After touching round 58 the price slipped back over a point. This appeared to cause some selling in other directions and the home railway market mostly closed on Wednesday at a lower level. London & North Eastern stocks were steady pending declaration of the dividend statement to-day (Friday). In foreign railways the trend

of Argentine and Brazilian stocks was downward. The list price of Argentine Transandine 5 per cent. debenture stock was reduced 10½ points to 60-70 owing to pressure to sell a small lot of stock which was effected at 60. The previous business in the stock was on October 5 at 73. Southern San Paulo debenture stock rose two points to 37-42 xd but no business was recorded as having taken place at the higher figure, the last business having been three weeks ago at 38.

Manila debenture stocks moved up in price and the Beira certificates kept a good part of their recent big advances on the statement that returns for the first two months of current financial year show a further increase in net revenue. Canadian Pacific common and preferred shares retained the greatest part of this year's appreciation in price despite the absence of dividends, the market being encouraged by the statement that traffic earnings are showing continuous improvement this year.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1933-34	Week Ending	Traffic for Week		No. of Week	Aggregate Traffic to Date			Shares or Stock	Prices					
			Total this year	Inc. or Dec. compared with 1933		Totals		Increase or Decrease		H ighest 1933	Lowest 1933	Feb. 14, 1934	Yield % (See Note)		
						This Year	Last Year								
			£	£		£	£	£							
Antofagasta (Chili) & Bolivia	830	11 2.4	9 620	+	1,220	6	70,000	53,150	+	16,850	Ord. Stk.	26	113½	21½	Nil
Argentine North Eastern	753	10.2.34	9,340	+	700	32	325,200	358,100	+	32,900		14½	5	9½	Nil
Argentine Transandine	111	13.1.34	1,540	+	130	28	30,950	5,640	+	25,310	A. Deb.	55	40	50	8
Bolivar	170	Jan., 1934	6,550	+	1,050	4	6 550	7,600	+	1,050	6 p.c. Db.	10	5	10	Nil
Brazil	—	—	—	—	—	—	—	—	—	—	Bonds.	15	11	12½	4
Buenos Ayres & Pacific	2,806	10.2.34	139,000	+	11,000	32	3,176,000	3,323,000	+	147,000	Ord. Stk.	26	97½	14½	Nil
Buenos Ayres Central	190	4.2.34	8,643	+	410	32	319,373	295,203	+	24,170	Mt. Db.	30	10	27½	Nil
Buenos Ayres Gt. Southern	5,075	10.2.34	302,000	+	12,000	32	6,181,000	6,115,000	+	66,000	Ord. Stk.	44½	21½	32	Nil
Buenos Ayres Western	1,926	10.2.34	75,000	+	5,000	32	2,015,000	2,105,000	+	90,000		24½	15½	25	Nil
Central Argentine	3,700	10.2.34	210,000	+	28,000	32	5,274,000	5,948,000	+	674,000	"	28½	15	21	Nil
Do.	—	—	—	—	—	—	—	—	—	—	Dfd.	18	10	13½	Nil
Cent. Uruguay of M. Video	273	10.2.34	17,151	+	4,364	32	522,225	490,891	+	31,334	Ord. Stk.	20	8	15	Nil
Do. Eastern Extn.	311	10.2.34	3,779	+	500	32	102,384	104,237	+	1,853	—	—	—	—	—
Do. Northern Extn.	185	10.2.34	1,862	+	159	32	55,561	60,838	+	5,277	—	—	—	—	—
Do. Western Extn.	211	10.2.34	2,267	+	1,084	32	51,232	45,026	+	6,206	—	—	—	—	—
Cordoba Central	1,218	10.2.34	39,000	+	4,000	32	1,368,000	1,367,000	+	1,000	Ord. Inc.	91½	21½	6	Nil
Costa Rica	188	Nov., 1933	18,534	+	3,195	21	99,724	107,788	+	8,064	Stk.	29	20	25½	Nil
Entre Rios	70	Jan., 1934	11,700	+	3,900	4	11,700	7,800	+	3,900	1 Mt. Db.	76½	68½	80	7½
Entre Rios	810	10.2.34	16,800	+	4,800	32	511,200	508,100	+	3,100	Ord. Stk.	26½	9	20	Nil
Great Western of Brazil	1,082	10.2.34	11,400	+	4,700	6	68,800	103,200	+	34,400	Ord. Sh.	23½	12	3½	Nil
International of Cl. Amer.	794	Year, 1933	—	—	—	52	\$4,537,681	\$5,013,065	+	\$475,384	—	—	—	—	—
Interoceanic of Mexico	—	—	—	—	—	—	—	—	—	—	1st Pref.	16	1½	1½	Nil
La Guaira & Caracas	224	Jan., 1934	4,400	+	2,710	4	4,400	7,110	+	2,710	Stk.	12	1	12½	Nil
Leopoldina	1,918	10.2.34	27,249	+	244	6	128,854	146,882	+	18,128	Ord. Stk.	20½	10	15	Nil
Mexican	483	7.2.34	\$184,400	+	\$1,400	5	\$1,045,800	\$925,700	+	\$120,100	—	3	1	2½	Nil
Midland of Uruguay	319	Jan., 1934	11,450	+	3,230	30	68,680	60,424	+	8,256	Ord. Stk.	2	1	2	Nil
Nitrate	411	31.1.34	17,694	+	14,586	4	33,649	5,488	+	28,161	Ord. Sh.	78.6	11½	3½	Nil
Paraguay Central	274	3.2.34	2,930	+	620	31	100,820	86,560	+	14,260	Pr. Li. Stk.	72	49½	67	8½
Peruvian Corporation	1,059	Jan., 1934	58,729	+	8,381	30	388,420	396,121	+	7,701	Pref.	15½	5	12½	Nil
Salvador	100	3.2.34	2,388	+	4,578	32	34,251	74,244	+	39,993	Pr. Li. Db.	70	66½	70	7½
San Paulo	153½	4.2.34	31,101	+	11,874	5	140,586	155,184	+	14,598	Ord. Stk.	102	68	81	2½
Taitai	572	Jan., 1934	8,133	+	725	30	39,000	15,525	+	23,475	Ord. Sh.	13½	8	15½	6½
United of Havana	1,365	10.2.34	20,517	+	3,435	32	430,665	467,961	+	37,296	Ord. Stk.	8	2	6	Nil
Uruguay Northern	73	Jan., 1934	922	+	637	30	8,305	11,474	+	3,169	Deb. Stk.	6	3½	5	Nil
Canada	23,750	7.2.34	532,201	+	85,228	5	2,844,716	2,391,691	+	453,025	—	—	—	—	—
Canadian National	—	—	—	—	—	—	—	—	—	—	Perp. Dbs.	601½	38	64	6½
Canadian Northern	—	—	—	—	—	—	—	—	—	—	4 p.c. Gar.	995½	85	100½	4
Grand Trunk	—	—	—	—	—	—	—	—	—	—	Ord. Stk.	22½	11	17	Nil
Canadian Pacific	17,018	7.2.34	431,000	+	75,600	5	2,225,000	1,890,600	+	334,400	—	—	—	—	—
India	1,329	13.1.34	23,820	+	620	41	962,097	986,705	+	24,608	Ord. Stk.	79	70	73½	41½
Barsi Light	202	20.1.34	2,265	+	592	42	121,207	112,147	+	9,060	Ord. Sh.	101½	70	98½	61½
Bengal & North Western	2,113	20.1.34	35,331	+	16,077	16	752,581	721,786	+	30,795	Ord. Stk.	292	240	271	5½
Bengal Doonars & Extension	161	20.1.34	2,637	+	329	42	125,888	126,292	+	404	"	127	119	125	5½
Bengal-Nagpur	3,269	6.1.34	115,200	+	6,950	40	4,183,397	3,859,565	+	323,832	"	97½	83½	98½	41½
Bombay, Baroda & C. India	3,089	10.2.34	194,700	+	20,325	45	6 690,690	6 499,425	+	191,175	"	112	107	110½	51½
Madras & South'n Mahratta	3,230	20.1.34	95,400	+	6,154	42	4,507,677	4,337,097	+	170,580	"	127	114½	123½	7½
Rohilkund & Kumaon	572	20.1.34	11,400	+	372	16	141,135	132,001	+	9,134	"	260	225	250	6
South India	2,526	20.1.34	68,335	+	4,045	42	3,278,165	3,329,408	+	51,242	"	119½	112	116½	6½
Beira-Umtali	204	Dec., 1933	49,418	+	13,362	12	149,024	116,708	+	32,316	—	—	—	—	—
Bilbao River & Cantabrian	15	Dec., 1933	988	+	48	52	18,980	21,553	+	2,573	—	—	—	—	—
Egyptian Delta	621	31.1.34	8,227	+	993	44	199,295	219,710	+	20,415	Prf. Sh.	151½	13½	2	Nil
Great Southern of Spain	134	3.2.34	1,806	+	471	5	11,322	11,053	+	269	Inc. Deb.	4	3	5½	Nil
Kenya & Uganda	1,625	Aug., 1933	159,746	+	12,456	35	1,525,550	1,273,216	+	250,334	—	—	—	—	—
Manila	—	—	—	—	—	—	—	—	—	—	B. Deb.	53	33½	42	8½
Mashonaland	913	Dec., 1933	90,716	+	35,205	12	277,053	178,354	+	98,699	1 Mt. Inc. Db.	91½	42	92	5½
Midland & W. Australia	277	31.12.33	15,285	+	870	25	80,396	77,686	+	2,710	Mt. Inc. Db.	89	70	95½	47½
Nigerian	1,903	30.12.33	59,505	+	2,698	40	1,205,229	1,300,165	+	94,936	—	—	—	—	—
Rhodesia	1,538	Dec., 1933	149,133	+	43,759	12	465,925	319,334	+	146,591	4 p.c. Db.	98½	80½	99½	4
South African	13,151	20.1.34	468,110	+	34,022	43	19,667,462	16,497,428	+	2,570,034	—	—	—	—	—
Victorian	6,172	Nov., 1933	778,567	+	11,734	21	3,576,106	3,675,303	+	199,197	—	—	—	—	—
Zafra & Huelva	112	Nov., 1933	10,926	+	149	47	123,826	120,955	+	2,871	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1%.

† Receipts are calculated @ 1s. 6d. to the rupee. ‡ Ex dividend. § Average rate of exchange for the week:—This year 325½d. Last year 415½d.

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